

# **Ferndale Timber Sale Environmental Assessment**



**Kalispell Unit  
Northwest Land Office  
Montana Department of Natural Resources and Conservation  
September 2018**



# Ferndale Timber Sale

## Environmental Assessment

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## Environmental Assessment

**Project Name: Ferndale Timber Sale**  
**Proposed Implementation Date: October 2019**  
**Proponent: Kalispell Unit, Northwest Land Office, Montana DNRC**  
**County: Lake**

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### Type and Purpose of Action

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#### Description of Proposed Action:

The Kalispell Unit of the Montana Department of Natural Resources and Conservation (DNRC) is proposing the Ferndale Timber Sale. The project is located approximately 2 air miles SE of Bigfork, MT (refer to Attachments vicinity map A-1 and project map A-2) and includes the DNRC managed portions of the following sections:

Beneficiary	Legal Description	Total Acres	Treated Acres
Common Schools			
Public Buildings			
MSU 2 <sup>nd</sup> Grant			
MSU Morrill			
School of Mines	S. 3 T 26N R 19W	155	155
Montana Tech			
University of Montana			
School for the Deaf and Blind			
State Normal School	S. 4 T 26N R 19W	280	242
	S. 9 T 26N R 19W	80	71
	S. 10 T 26N R19W	320	240
Veterans Home			
Public Land Trust			
Acquired Land			

Objectives of the project include:

- Reduce fire danger in wildland urban interface.
- Increase vigor of leave trees.
- Reduce presence of and susceptibility to disease factors.
- Promotion of a new generation of shade-tolerant species in shelterwood treatments.
- Upgrading of current road system to meet with best management practices.
- Minimize risks from invasive species associated with illegal ATV use.

Proposed activities include:

Action	Quantity
Proposed Harvest Activities	# Acres
Clearcut	
Seed Tree	
Shelterwood	437
OSR	80
Commercial Thinning	77
Old-Growth Maintenance	71
Total Treatment Acres	708
Proposed Forest Improvement Treatment	# Acres
Pre-commercial Thinning	
Planting	10
Proposed Road Activities	# Miles
New permanent road construction	
New temporary road construction	.59
Road maintenance	
Road reconstruction	4.03
Road abandoned	
Road reclaimed	1.1
Other Activities	

Duration of Activities: 3 years

Implementation Period: Oct. 2019 – Oct. 2022

The lands involved in this proposed project are held in trust by the State of Montana. (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the DNRC are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for the beneficiary institutions (Section 77-1-202, MCA).

The DNRC would manage lands involved in this project in accordance with:

- The State Forest Land Management Plan, SFLMP (DNRC 1996),
- Administrative Rules for Forest Management (ARM 36.11.401 through 471),
- The Montana DNRC Forested State Trust Lands Habitat Conservation Plan (HCP) (DNRC 2010)
- and all other applicable state and federal laws.

## Project Development

### SCOPING:

- DATE:
  - December, 2017
- PUBLIC SCOPED:
  - The scoping notice was posted on the DNRC Website: <http://dnrc.mt.gov/public-interest/public-notice>
  - Adjacent landowners, statewide scoping list, newspapers, user groups.
- AGENCIES SCOPED:
  - CSKT, Chippewa Cree, Fort Peck Assiniboine and Sioux, Northern Cheyenne, Fort Belknap Assiniboine and Gros Ventres, Blackfeet, MT FWP.
- COMMENTS RECEIVED:
  - How many: Eight
  - Concerns: Residents in the area had the following concerns
    - Some parts of the area were treated ~20 years ago and need no forest management
    - The area is overgrown and needs intensive forest management for fire safety and forest health.
    - There are natural springs in the area that need protected.
    - Clarification of terminology.
    - The wet area surrounding carney creek is important to wildlife and needs protected.
    - Many residents would like to be kept apprised as management decisions are made.
  - Results (how were concerns addressed):
    - A field trip was held in April 2018 to explain forest management goals and planned treatments for highly concerned residents.
    - Thick regeneration in the area will be thinned during commercial thinning applications.
    - A thorough survey of the areas of concern was done to find and protect streams and springs.
    - All questions about terminology were answered.
    - The area surrounding carney creek is outside of the recommended treatment areas.
    - Any residents who requested more information have been kept updated as management recommendations have developed.

Internal and external issues and concerns were incorporated into project planning and design and will be implemented in associated contracts.

### OTHER PUBLIC INVOLVEMENT:

- Tours: April 2018

### INTERDISCIPLINARY TEAM (ID):

- Project Leader: Caleb Deitz

- Archeologist: Patrick Rennie
- Wildlife Biologist: Leah Breidinger
- Hydrologist: Tony Nelson
- Silviculturist: Tim Spoelma

**OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:** (*Conservation Easements, Army Corps of Engineers, road use permits, etc.*)

- **United States Fish & Wildlife Service-** DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at <http://dnrc.mt.gov/divisions/trust/forest-management/hcp>.
- **Montana/Idaho Airshed Group-** The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006). As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit.

**ALTERNATIVES CONSIDERED:**

**No-Action Alternative:** No Forest management activities would occur.

**Action Alternative:** Timber harvesting would occur across ~710 acres of state trust lands. Harvest prescriptions would mimic natural disturbance regimes and promote the forest towards desired future conditions. Care would be taken to reduce prevalence of insects and disease during these harvests. In areas where regeneration is a goal a combination of piling and scarification as well as planting would occur. A small section of the project area (~80 acres) is old growth forest and care would be taken to maintain this forest condition.

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## Impacts on the Physical Environment

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**VEGETATION:**

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to vegetation:

- Timber harvesting and associated activities may affect stand characteristics with regards to species composition, stand age, and succession.
- Timber harvesting and associated activities may affect stand structure and development.
- Overstocked stand conditions are contributing to loss of timber productivity and increased risk of mortality from insect and disease or fire.
- Overstocked stand conditions and downed woody fuel loading may increase fire hazard.
- Timber harvest activities could adversely affect sensitive riparian vegetation systems in the project area.
- Timber harvesting and associated activities could spread noxious weeds in the project area.
- Old-growth forest is present in the project area. As part of the SLFMP this forest state should be protected and maintained when feasible.

**Recommended Mitigation Measures for Vegetation-** The analysis and levels of effects to vegetation resources are based on implementation of the following mitigation measures.

- Due to historic fire suppression and industrial logging methods this area is well outside of desired future conditions (DFC). Silvicultural treatments would guide the project area towards DFC.
- Insects and disease that serve as a risk to future forest health would be treated as part of harvest prescriptions, reducing the prevalence of these forest health hazards.
- Care would be taken to limit soil displacement in areas where noxious weeds occur. Areas currently infected with noxious weeds would be treated for up to 5 years after timber harvest.
- Logging slash can be a source of significant wildfire risk. Slash would be piled and burnt post-harvest to mitigate this risk.
- Following forest BMP's would mitigate risk of noxious weed spread and excessive erosion that negatively impact riparian areas.
- Treatments in old-growth forest segments of the project area would be designed to maintain this forest state.

**FOR COMPLETE VEGETATION ANALYSIS SEE ATTACHMENT B.**

## **SOILS:**

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to soils:

- Slope stability could be negatively impacted by timber harvesting, however soils in the project area are at low risk for negative impacts.

- Logging operations and associated road building and maintenance could cause erosion issues in the project area.
- Historic logging operations did not meet BMP practices for logging.
- Nutrient loading in the project area is currently below recommended levels for rocky mountain forests.

**Recommended Mitigation Measures for Soils-** The analysis and levels of effects to soils resources are based on implementation of the following mitigation measures.

- Limit equipment operations to periods when soils are dry (less than 20% oven-dried weight), frozen or snow-covered in order to minimize soil compaction and rutting, and to maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid trail planning would identify which existing trails to use and how many additional trails are needed.
- Do not use existing trails if they are located in draw bottoms or other unfavorable locations.
- Grass seeding or other erosion control measures may be required to stabilize some trails.
- Limit ground-based operations to slopes less than 40% unless they can be used without causing excessive displacement or erosion.
- Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for surface drainage of all roads and skid trails concurrent with operations.
- Slash disposal: Limit the total of disturbance and scarification to 30-40 percent of harvest units.
- Limit dozer piling to slopes less than 35 percent and limit excavator piling to slopes less than 40 percent unless it can be completed without causing excessive erosion.
- Retain between 5 and 14 tons/acre of woody debris 3-inches in diameter or greater (depending on habitat type) and a feasible majority of fine branches and needles following harvesting operations. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves fine slash on site; 2) for whole-tree harvesting, return skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

**FOR COMPLETE SOILS ANALYSIS SEE ATTACHMENT C.**

## **WATER RESOURCES:**

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to water resources:

- Timber harvesting could affect stream temperature in class one streams in the project area.
- New and existing roads could contribute sediment to hydrologic resources in the project area.
- Removing vegetation on existing roads could create sediment issues.



**Recommended Mitigation Measures for Water Resources-** The analysis and levels of effects to water resources are based on implementation of the following mitigation measures.

Hydrologic related resource mitigations that would be implemented with the proposed Action Alternative include:

- implement Riparian Management Zones on all class 1 streams based on site-potential tree heights in the project area
- implement BMPs on all newly constructed roads and improve BMPs on existing roads where needed
- use spot-blading on existing roads to preserve as much of the existing vegetative cover as possible on vegetated road surfaces

**FOR COMPLETE WATER RESOURCES ANALYSIS SEE ATTACHMENT D.**

**FISHERIES RESOURCES** *(including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

After the consideration of project-specific issue statements and the extent of the proposed actions, potential effects to fisheries resources in the Carney creek watershed are dismissed from further assessment. Potential effects to fisheries resources are dismissed from further assessment due to: (1) less than 10% of the acreage within the watershed would be affected by timber harvest, (2) no timber harvest would occur within 50 feet of any stream channel in the watershed. No foreseeable direct or indirect impacts to fisheries resources would be expected to occur in the watershed, and no additional cumulative effects to fisheries resources would be expected in the watershed as a result of implementing the Action Alternative.

**WILDLIFE** *(terrestrial & avian including unique, federally listed as threatened or endangered, sensitive, and/or species of special concern):*

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to wildlife:

- Mature forest cover and connectivity. The proposed activities could decrease mature forested cover, which could reduce habitat connectivity and suitability for wildlife species associated with mature forests.
- Old-growth forests. The proposed activities could affect wildlife species associated with old-growth forests by reducing habitat availability and increasing fragmentation.
- Canada lynx. The proposed activities could reduce landscape connectivity and the availability of suitable Canada lynx habitat, reducing the capacity of the area to support Canada lynx.
- Grizzly bears. The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats, and/or by increasing risk of human-caused bear mortality.
- Fishers. The proposed activities could reduce the availability and connectivity of suitable fisher habitat and increase human access, which could reduce fisher habitat suitability and increase trapping mortality.

- Pileated woodpeckers. The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers.
- Big game winter range. The proposed activities could reduce cover, which could reduce the quality of big game winter range habitat.

**Recommended Mitigation Measures for Wildlife-** The analysis and levels of effects to wildlife are based on implementation of the following mitigation measures.

- If a threatened or endangered species is encountered, consult a DNRC biologist immediately. Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area contact a DNRC biologist.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per *ARM 36.11.444(2)* and *GB-PR2 (USFWS and DNRC 2010)*.
- Contractors will adhere to food storage and sanitation requirements as described in the timber sale contract. Ensure that all attractants such as food, garbage, and petroleum products are stored in a bear-resistant manner.
- Restrict public access at all times on restricted roads that are opened for harvesting activities. Effectively close all restricted roads following harvest completion.
- Prohibit commercial forest management activities from April 1- June 15 to protect grizzly bears during the spring in all units. In the Section 10 40-acre unit adjacent to Loon Lake, extend the timing restriction from April 1 – July 15 to protect nesting loons.
- In Section 9, 4 years of active management is permitted followed by an 8-year rest as per GG-SC2. The active/rest period must be tracked by the contract administrator.
- Retain patches of advanced regeneration of shade-tolerant trees as per *LY-HB4* in all harvest units (*USFWS and DNRC 2010*).
- Retain visual screening along roads where possible to increase security for wildlife.
- Retain at least 2 snags and 2 snag recruits per acre that are ≥ 21 inches diameter or the next largest available size class, favoring western larch and Douglas-fir for retention. If snags are cut for safety concerns, they must be left in the harvest unit.
- Retain 4 to 15 tons/acre of coarse-woody debris. Retain coarse-woody debris according to *ARM 36.11.414* and emphasize retention of 15-inch diameter downed logs aiming for at least one 20-foot-long section per acre.

**FOR COMPLETE WILDLIFE ANALYSIS SEE ATTACHMENT F.**

## **AESTHETICS**

Any change to the scenery in the area from these alternatives would be in addition to past activity within the project area. This analysis includes all past and present effects.

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to aesthetics:

1. Historic clear-cut harvest of timber in the area has left a lasting impression on the aesthetic quality of the surrounding hillsides.

**Recommended Mitigation Measures for Aesthetics-** The analysis and levels of effects to aesthetics are based on implementation of the following mitigation measures.

1. Most of the proposed treatments have a limited impact on aesthetics. The limited group select areas will mimic small blowdown or disease impacted areas common in the area.

### **Existing Conditions**

Historic timber harvesting along with forest fires and development have created a mosaic of forest appearance on hillsides in the project area.

### **Environmental Effects**

Timber harvesting would alter the aesthetic state in the area but any aesthetic change will be minimal and only in contrast to the current state for a short period. As revegetation of skid trails and landing occurred in the project area changes to aesthetics would become unnoticeable.

### **-VISUAL QUALITY**

#### **No-Action Alternative:**

No effects to visual quality

#### **Action Alternative:**

#### ***Direct, Secondary, and Cumulative Effects***

Through the proposed sale area, slash from the harvest would be noticeable yet temporary. Generally slash disappears from the site within five years, and is often covered by other vegetation within three years. Again, sites would be generally lighter in color than can be seen currently.

### **-NOISE**

#### **No-Action Alternative:**

No effects to noise.

#### **Action Alternative:**

#### ***Direct, Secondary, and Cumulative Effects***

Harvest activities would be quite audible, and, depending upon air conditions, equipment could be heard many miles from their location. Noise would be generated by harvest operations, harvest related traffic, road construction, and administrative oversight. This could be expected to be present for the entire season of harvest, typically from mid-June through mid-March of the following year, for the duration of the harvest of two to three years during the general "work week".

Based on the anticipated operating periods and the short duration of the timber sale direct, secondary, and cumulative effects of noise will be low.

### **HISTORICAL AND ARCHEOLOGICAL SITES:**

- Scoping letters were sent to those Tribes that requested to be notified of DNRC timber sales. No response was returned that identified a specific cultural resource issue. A Class I (literature review) level review was conducted by the DNRC staff archaeologist for the area of potential effect (APE). This entailed inspection of project maps, DNRC's sites/site leads database, land use records, General Land Office Survey Plats, and control cards. No historical or archeological resources were discovered.

## **DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, AND ENERGY:**

There will be no measurable direct, secondary, and cumulative impacts related to environmental resources of land, water, air, and energy due to the relatively small size of the timber sale project.

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## **Impacts on the Human Population**

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### **HUMAN HEALTH AND SAFETY:**

#### **Air Quality**

The DNRC is a member of the Montana/Idaho Airshed Group which was formed to minimize or prevent smoke impacts while using fire to accomplish land management objectives and/or fuel hazard reduction (Montana/Idaho Airshed Group 2006). The Group determines the delineation of airsheds and impact zones throughout Idaho and Montana. Airsheds describe those geographical areas that have similar atmospheric conditions, while impact zones describe any area in Montana or Idaho that the Group deems smoke sensitive and/or having an existing air quality problem (Montana/Idaho Airshed Group 2006).

The project area is located within Montana Airshed 2, which encompasses portions of Flathead and Lake Counties. Currently, this Airshed does contain impact zones.

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to air quality:

- Smoke will be produced during pile burning.
- Dust will be produced during harvesting and hauling activities.

**Recommended Mitigation Measures for Air Quality-** The analysis and levels of effects to air quality are based on implementation of the following mitigation measures:

- Only burn on days approved by the Montana/Idaho Airshed group and DEQ.
- Conduct test burn to verify good dispersal.
- Dust abatement may be used as necessary.
- Slower speed limits may be included in contracts as necessary to reduce dust.

### **-SLASH BURNING**

**No-Action Alternative:**

No slash would be burned within the project areas. Thus, there would be no effects to air quality within the local vicinity and throughout Airshed 2.

**Action Alternative:**

***Direct and Secondary Effects***

Slash consisting of tree limbs and tops and other vegetative debris would be piled throughout the project area during harvesting. Slash would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning are less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1,4 Butadiene, and Polycyclic Organic Matter. Burning within the project area would be short in duration and would be conducted when conditions favor good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days.

Thus, direct and secondary effects to air quality due to slash burning associated with the proposed action would be minimal.

***Cumulative Effects***

Cumulative effects to air quality would not exceed the levels defined by State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana/Idaho Airshed Group. Prescribed burning by other nearby airshed cooperators (for example the U.S. Forest Service) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should decrease the likelihood of additive cumulative effects. Thus, cumulative effects to air quality due to slash burning associated with the proposed action would also be expected to be minimal.

**-DUST**

**No-Action Alternative:**

No increased dust would be produced as a result of the proposed timber sale. Current levels of dust would be produced in the area.

**Action Alternative:**

***Direct, Secondary, and Cumulative Effects***

Harvesting operations would be short in duration. Dust may be created from log hauling on portions of native surface roads during summer and fall months. Contract clauses would provide for the use of dust abatement or require trucks to reduce speed if necessary to reduce dust near any affected residences.

Thus, direct, secondary, and cumulative effects to air quality due to harvesting and hauling associated with the proposed action would be minimal.

**Log Hauling Traffic**

Log hauling traffic is common in the project area.

**Issues and Concerns-** The following issue statements were developed during scoping regarding the effects of the proposed action to log hauling traffic:

- There will be increased travel on weekends.
- Trucks will drive fast.

**Recommended Mitigation Measures for Log Hauling Traffic-** The analysis and levels of effects of log hauling traffic is based on implementation of the following mitigation measures:

- Log hauling will take place typically during the general “work week”.
- Signs will be posted making the public aware of log hauling traffic in the area.
- If necessary, a slower speed limit may be imposed in the timber harvest contract.

**No-Action Alternative:**

No increase in log truck traffic would occur.

**Action Alternative:**

***Direct, Secondary, and Cumulative Effects***

Log truck traffic in the area would increase for the duration of the timber sale. However signs will be posted indicating that log truck traffic is present in the area. If necessary, a slower speed limit may be imposed in the timber harvest contract.

Based on the mitigation measures direct, secondary, and cumulative effects of log hauling on human health and safety would be minimal.

**RECREATION *(including access to and quality of recreational and wilderness activities):***

The area is used for hiking, hunting, cross-country skiing, snowmobiling and general recreating. Currently, roads through the area are closed to motorized use and used only for administrative purposes. There would be no change in road closure status and the selection of either alternative would not affect the ability of people to recreate on this parcel.

There will be no change from existing conditions. Therefore, there would be no measurable direct, secondary, or cumulative impacts on recreation from this proposed action.

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
<i>No-Action</i>														
Health and Human Safety	x				X				x					
Industrial, Commercial, and Agricultural Activities and Production	X				X				X					
Quantity and Distribution of Employment	X				X				X					

Will Alternative result in potential impacts to:	Impact												Can Impact Be Mitigated?	Comment Number
	Direct				Secondary				Cumulative					
	No	Low	Mod	High	No	Low	Mod	High	No	Low	Mod	High		
Local Tax Base and Tax Revenues	X				X				X					
Demand for Government Services	X				X				X					
Density and Distribution of Population and Housing	X				X				X					
Social Structures and Mores	X				X				X					
Cultural Uniqueness and Diversity	X				X				X					
Action														
Health and Human Safety	X				X				X					
Industrial, Commercial, and Agricultural Activities and Production	X				X				X					
Quantity and Distribution of Employment	X				X				X					
Local Tax Base and Tax Revenues	X				X				X					
Demand for Government Services	X				X				X					
Density and Distribution of Population and Housing	X				X				X					
Social Structures and Mores	X				X				X					
Cultural Uniqueness and Diversity	X				X				X					

**LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS** *(includes local MOUs, management plans, conservation easements, etc):*

N/A

**OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:**

The proposed action has a projected harvest volume between 3,910 and 5,140 MMBF. This volume is worth approximately \$435/MBF delivered to a forest product manufacture site at current market prices. Delivered to market, the proposed action has a total revenue value of an estimated \$1,968,375.00. Removing the timber sale purchaser's contracted operations and DNRC's development, administration, and operation expenses, the trust beneficiaries net between an estimated 15 and 35 percent of total delivered sawlog market value. Therefore, the proposed action may generate net income for trust beneficiaries between \$295,256.25 and \$688,931.25.

Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC does not track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program.

Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. A recent revenue-to-cost ratio of the Northwest Land Office was 2-1. This means that, on average, for every \$1.00 spent in costs, \$2.00 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return.

Mills in Montana need 351 MMBF per year to maintain current production levels and industry infrastructure. Currently the Sustained yield and target harvest from Trust Lands is 57.6 MMBF, which represents approximately 16.4% of timber harvested in the state of Montana. This project would provide approximately 4.5 MBF of timber towards the sustained yield target thus helping sustain current mill capacity.

### Environmental Assessment Checklist Prepared By:

**Name:** Caleb Deitz  
**Title:** Forester  
**Date:** November 14, 2018

## Finding

### Alternative Selected

The action alternative

### Significance of Potential Impacts

No significant impacts are expected from this action. All mitigations described in the EA are adequate to minimize impacts to the lands and to the users of these lands due to the proposed treatment described. The project will reduce fuel loads for wildland fire danger within the urban interface and enhancing forest health. The implementation of Best Management Practices along the new and old access road will help in mitigating sedimentation/erosion and the reducing of access to unauthorized motor vehicles will help in minimizing and managing noxious weeds. Moving the stand structure towards a more desired future condition will benefit and enhance these trust lands for future generations helping to make a more resilient forest.

### Need for Further Environmental Analysis

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	EIS		More Detailed EA	No Further Analysis

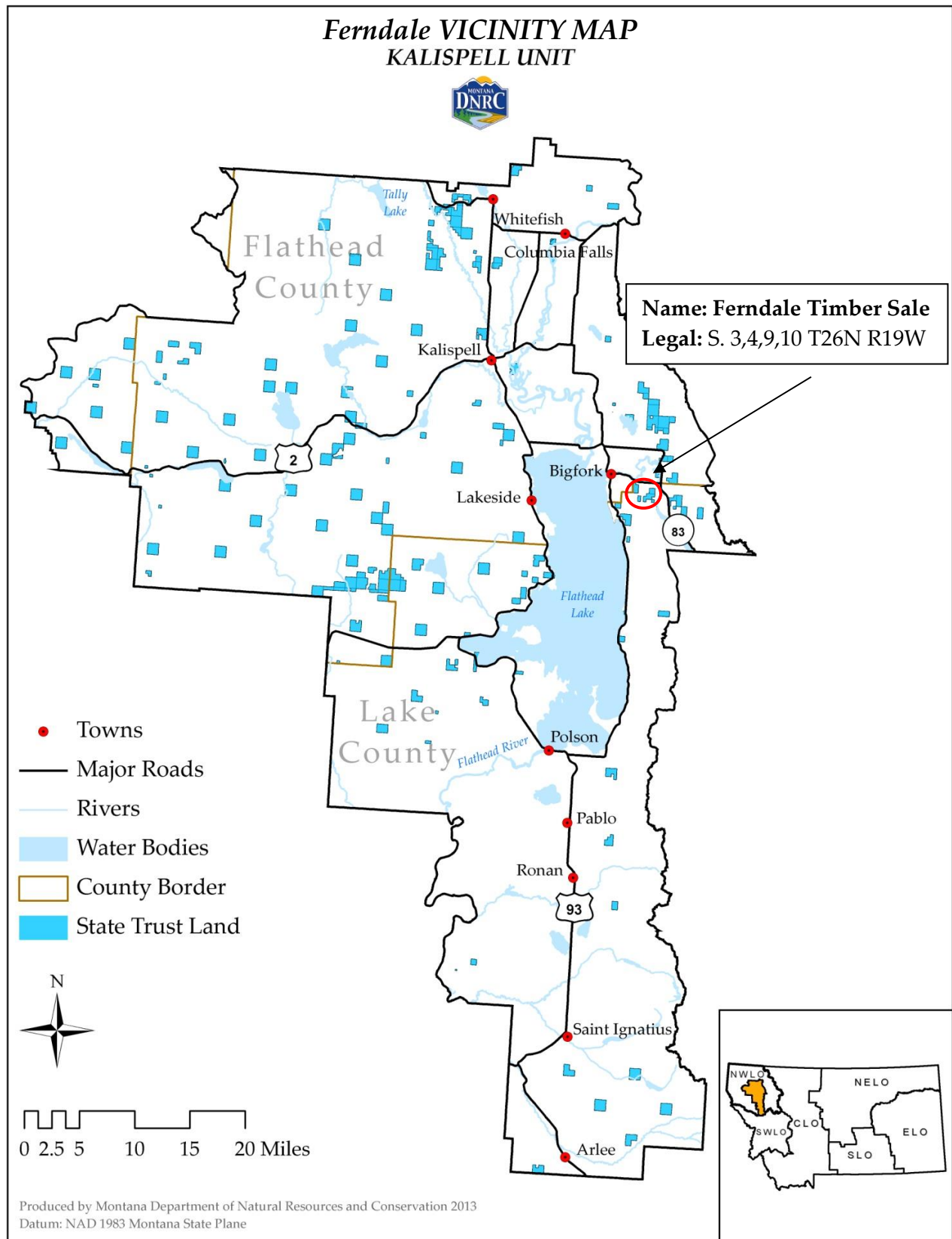
### Environmental Assessment Checklist Approved By:

**Name:** David M. Poukish  
**Title:** Kalispell Unit Manager  
**Date:** 11/27/2018  
**Signature:** /s/ David M. Poukish

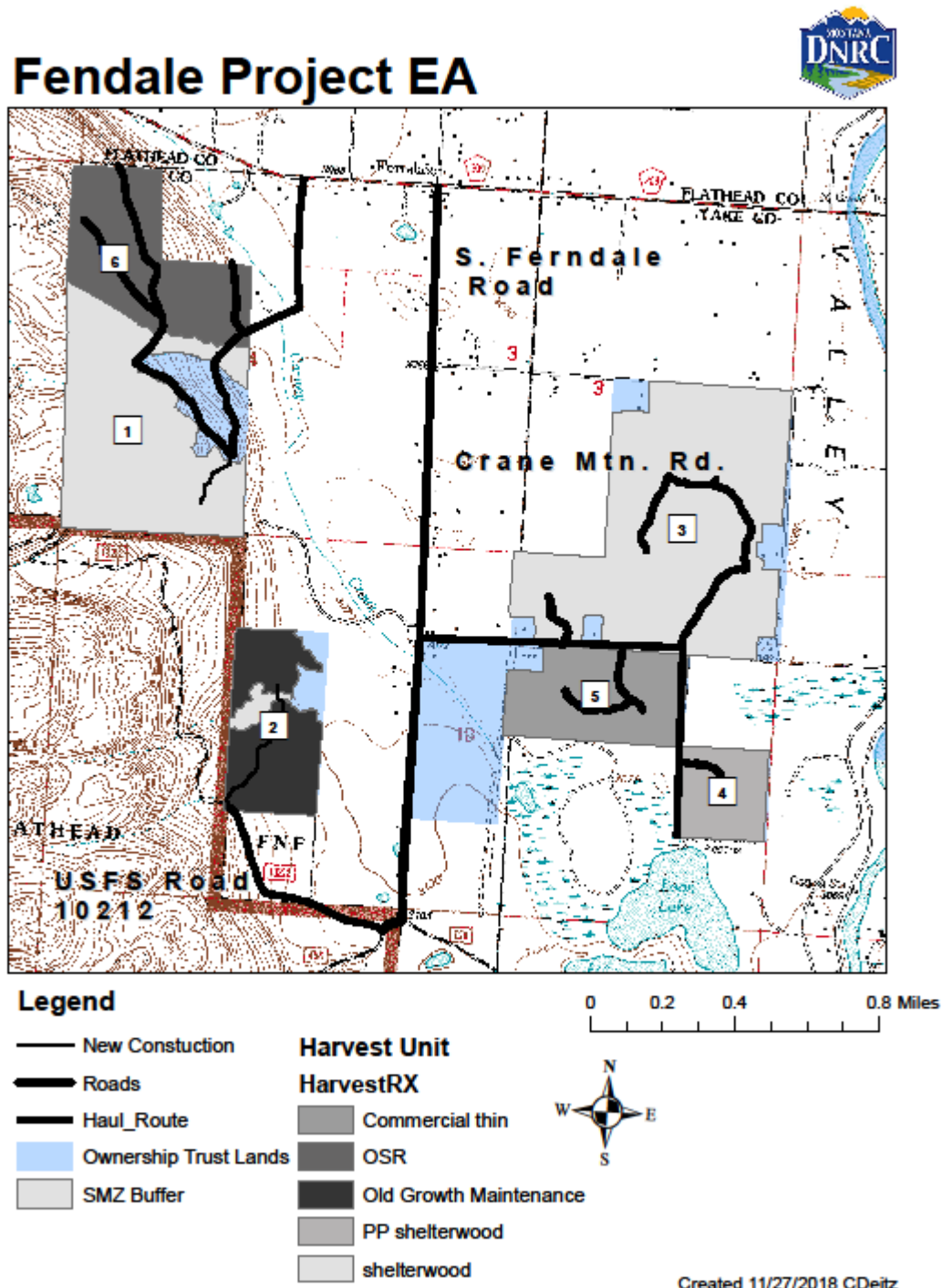


## **Attachment A - Maps**

A-1: Ferndale Timber Sale Vicinity Map



A-2: Ferndale Timber Sale Harvest Units



## **Attachment B – Vegetation**

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## Ferndale Timber Sale – Vegetation Analysis

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### Analysis Prepared By:

Name: Caleb Deitz

Title: Forester, Montana DNRC

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## Introduction

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The vegetation section describes present conditions and components of the forest as well as the anticipated effects of both the No Action and the Action Alternatives.

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## Issues and Measurement Criteria

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- Timber harvesting and associated activities may affect stand characteristics with regards to species composition, stand age, and succession.
- Timber harvesting and associated activities may affect stand structure and development.
- Overstocked stand conditions are contributing to loss of timber productivity and increased risk of mortality from insect and disease.
- Overstocked stand conditions and downed woody fuel loading may increase fire hazard.
- Timber harvest activities could adversely affect sensitive riparian vegetation systems in the project area.
- Old-growth forest is present in the project area. As part of the SLFMP this forest state should be protected and maintained when feasible.

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## Regulatory Framework

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The following plans, rules, and practices have guided this project's planning and/or will be implemented during project activities:

- SFLMP
- DNRC – Administrative rules
- Best management practices for forestry
- State of Montana Habitat Conservation Plan

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## Analysis Areas

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### Direct and Secondary Effects Analysis Area

- Climatic Section M333B- Lower Flathead Valley (Losensky 1997) Scale was used in this analysis for comparing historic conditions related to the distribution of forest cover types and age classes, to current conditions within the project area. The Lower Flathead Valley geographic area includes Flathead Lake west to the Montana border, from the Canadian border south to Missoula, MT (Losensky 1997).

- The DNRC Kalispell Landscape Scale includes all scattered forested Trust land parcels, administered by the Kalispell Unit for DNRC. This geographic area is a subset of the above Lower Flathead Valley Climatic Section and includes school trust lands near Whitefish, MT south to Arlee, MT and school trust lands in the vicinity of Bigfork, MT west to the Thompson Chain of Lakes. Current and appropriate conditions related to forest cover types and age class distribution were analyzed on this scale.

#### **Cumulative Effects Analysis Area**

- The Ferndale Project Scale includes all trust lands within the project area specified in attached maps (S. 3,4,9 &10 T26N R19W) and more specifically, those stands proposed for harvesting under the action alternative. This scale was used to analyze expected changes in current forest conditions of the project area.

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## **Existing Conditions**

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#### **Noxious Weeds**

Invasive weeds are present in historic roads and landings. Primary species are orange and yellow hawkweed (*Hieracium aurantiacum*, *caespitosum*) and Canada thistle (*Cirsium arvense*). Houndstongue (*Cynoglossum officinale*), Oxeye Daisy (*Leucanthemum vulgare*) and Spotted knapweed (*Centaurea stoebe*) are also present.

#### **Rare Plants**

*Botrychium multifidum* (leathery grapefern) and *Botrychium virginianum* (rattlesnake fern) are reported as present in the area. These species are at high risk of extinction or extirpation at both a state and global level. *Botrychium* species are wetland affiliates so if encountered will likely already be protected by streamside protection zones. Neither of these species have been documented at the project level but if encountered harvest operations will be paused until proper mitigations are made by the forest officer.

#### **Standard Vegetative Community**

The Ferndale project scale area is dominated (~75%) by *Abies grandis*/ *Clintonia uniflora* (ABGR/CLUN) forest habitat type (Pfister, 1977)(DNRC SLI, 2014). This forest habitat type often displays all conifer species but as a site moves toward climax dominance of *Abies grandis* will become apparent. ABGR/CLUN is common on all aspects in moist sites between 2,400 and 5,000 feet in northwest Montana.

*Thuja plicata*/ *Clintonia uniflora* (THPL/CLUN) forest habitat type also occurs in ~11% of the Ferndale project scale area. This forest habitat type occurs only in the wettest portions of the area and is dominated by second growth *Thuja plicata* with an understory of low herbaceous and riparian obligate plants. In the Ferndale project area this forest habitat type is located in and along streamside management zones.

On drier portions of the Ferndale project scale area *Pseudotsuga menziesii*/ *Phsocarpus malvaceus* (PSME/PHMA) is the dominant forest habitat type (13%). This forest habitat type is dominated by *Pseudotsuga menziesii* with *Pinus ponderosa*, *Larix occidentalis* and *Pinus contorta* also present. The understory of this forest habitat type is often dominated by a mixture of shrubs including *Physocarpus malvaceus* or grasses dominated by *Calamagrostis rubescens*.

- **Stand History/Past Management**

The Ferndale project scale area is located on the valley floor near the intersections of Swan and Flathead valleys. This area has a long history of timber management dating back to before establishment of the school trust program. DNRC records indicate a variety of firewood, post and pole, house log and sawtimber harvest for small scale projects dating back to 1935 with the most significant project being the loon lake timber sale in the early 1980's. After the 1980's sale a variety of forest improvement projects occurred including planting, scarification and prescribed burning. Historic stumps in the area indicate the possibility of earlier harvests than on record. Other historic uses in the area (outside of areas being considered for harvest) include both cabin sites and grazing.

- **Current stand conditions (species composition, size, density, insects and disease, forest age class and distribution, etc.)**

The Ferndale project area is primarily a mixed conifer stand with patches of historic forest management. There are several small (>5 acre) and historic (1980) clearcuts that are heavily regenerated as well as some larger (~80 acre) seed tree units. Historic stumps in the area were logged with cross-cut saws indicating that logging in this area predates our records. Shade tolerant species dominate the areas surrounding creeks and springs. This is most evident in section 4 which is primarily a monoculture of *Thuja plicata*. Drier microhabitats in the area have large dominant *Pinus ponderosa* and *Larix occidentalis* with an understory of shade tolerant *Pseudotsuga menziesii*, *Abies grandis* and *Picea engelmannii*.

Insects and disease are present in the stand at endemic levels. Pockets of root rot (*Phaeolus schweinitzii*) and bark beetle (*Dendroctonus* spp.) mortality as well as low levels of Dwarf mistletoe (*Arceuthobium* spp.) are common in the Douglas fir/ Western larch dominated portions of the stand. Section 4 has the highest occurrence of disease with decadent Western larch and Grand fir showing widespread infection of Pini (*Phellinus pini*) and Indian paint fungus (*Echinodontium tinctorium*) respectively.

**Table V-1 – Current and appropriate cover type for the Ferndale Project Area.**

Cover Type	Current Acres	Current Percent of Project Area	Desired Future Condition (DFC)	
			Acres	Percent
Douglas-fir	36.95	5.17	0	0
Mixed conifer	83.55	11.70	0	0
Ponderosa pine	0	0	374.37	52.43
Western larch/Douglas-fir	580.18	81.25	159.07	22.28
Western white pine	13.3	1.87	179.93	25.20
Other (Hardwoods)	0	0	0.68	0.10
<b>Total:</b>	<b>714.06</b>		<b>714.06</b>	

### Old Growth

There is approximately 80 acres of old growth in the project area. This stand is dominated by western red cedar and has two primary age groups. Densely packed trees in the 0-40 age class and approximately 12 scattered 21" plus old growth trees per acre. Old growth characteristics are typical of this type of mixed conifer stand. Canopy closure is nearly 100% with a heavy mat of dense moss and little undergrowth. Openings are heavily regenerated with Western red cedar and vigor is high in these trees. Recommended forest management in this type is maintenance treatments to remove insects and disease and promote a steady state of old growth characteristics. Remnant dominant overstory Western white pine also exist in the stand. To promote this stand characteristic and desired future condition group select openings up to 1 acre will be cut around these trees. Piling and scarification will occur in these openings followed by planting of rust resistant WWP and western larch. While this treatment is outside of the usual old growth maintenance recommendations it should allow for regeneration of Western white pine and promote portions of this stand towards desired future condition.

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## Environmental Effects

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### **No Action Alternative: Direct and Secondary Effects and Cumulative Effects**

Under the No Action Alternative, natural processes would continue to have a direct influence on forest conditions.

### **Action Alternative: Direct, Secondary, and Cumulative Effects**

#### **Noxious Weeds**

##### ***Direct and Secondary***

Under the action alternative there would be an increased risk for the transport and spread of invasive weeds. This risk would be mitigated by washing logging equipment before it entered state lands and mandatory herbicide treatment along roads and in landings for three years post-harvest.

##### ***Cumulative***

If the action alternative were implemented DNRCs long term ability to manage noxious weeds would improve. By reducing illegal traffic in the area as well as improving legal access for state authorized vehicles the DNRC could better manage noxious weed spread.

#### **Rare Plants**

##### ***Direct and Secondary***

Currently there are no known plants in the project area, if rare plants were encountered the action alternative would be altered to mitigate risk to these species.

##### ***Cumulative***

The action alternative seeks to return much of the project area to a pre-settlement vegetative state. Stand alterations can increase species diversity in project areas (Halpern & Spies, 1995). Promotion of biodiversity is a goal of the action alternative pursuant to the Montana administrative rules for forest management (36.11.404).

#### **Standard Vegetative Community**

##### ***Direct and Secondary***

Under the action alternative timber harvesting would occur on approximately 700 acres. All treatments are designed to promote desired future condition respective to the forest development stage of specific areas. overstory trees infected with insects and disease would be removed, leaving behind a healthier, more vigorous forest. Understory vegetation would be affected by large equipment during harvesting activities but soil protections limit the effects and typically affected vegetation recovers within one growing season.

#### **Old Growth**

##### ***Direct and Secondary***

Old growth in the area would be treated with a maintenance harvest to reduce prevalence of insects and disease. This treatment would improve forest health and longevity of old growth in the project area. This treatment would also attempt to increase the prevalence of Western white pine in the old growth area. Secondary effects would be a slow move towards maximum potential vegetation in this project area.

##### ***Cumulative***

Old- growth maintenance treatments are designed to preserve old growth characteristics. Cumulatively, the proposed activities in this project area would result in long term management of old growth on this site.

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## **Vegetation Mitigations**

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- Insects and disease that serve as a risk to future forest health would be removed as part of harvest prescriptions, reducing the prevalence of these forest health hazards.
- Care would be taken to limit soil displacement in areas where noxious weeds occur. Areas currently infected with noxious weeds would be treated for up to 5 years after timber harvest.



- Due to historic fire suppression and industrial logging methods this area is well outside of desired future conditions. Silvicultural treatments would guide the project area towards DFC.
- Logging slash can be a source of significant wildfire risk. Slash would be piled and burnt post-harvest to mitigate this risk.
- Treatments in old-growth forest segments of the project area would be designed to maintain this forest state.

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## VEGETATION REFERENCES

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DNRC. 1996. Forestry Best Management Practices: State Forest Management Plan. Montana DNRC, Forest management Bureau. Missoula, MT.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Oldgrowth forest types of the Northern Region. USDA Forest Service, Northern region. Missoula, Montana.

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## **Attachment C – Soils**

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## Ferndale Timber Sale – Soils Analysis

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### Analysis Prepared By:

**Name: Tony Nelson**

**Title: Hydrologist, Montana DNRC**

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## Introduction

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The following analysis will disclose anticipated effects to soil resources within the Ferndale project area. Direct, secondary, and cumulative effects to soil resources of both the No-Action and Action alternatives will be analyzed.

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## Issues and Measurement Criteria

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### Soil Physical Properties

Analysis of soil physical properties addresses the issue that timber harvesting and associated activities may affect soil conditions in the proposed project area through ground-based and cable yarding activities, and through repeated entries to previously harvested areas. Operation of ground-based machinery can displace fertile layers of topsoil, which can lead to a decrease in vegetation growth. Ground-based machinery can also lead to compaction of the upper layers of soil. Compaction decreases pore space in soil, reduces its ability to absorb and retain water, and can increase runoff and overland flow. These conditions can also lead to a decrease in vegetation growth. Surface erosion can also affect vegetation growth and water quality. Sheet and rill erosion can remove fertile surface layers of soil, and also make revegetation difficult.

Measurement Criteria: Soil physical properties will be measured quantitatively by estimating the percentage of harvested ground that would be left in an impacted condition following activity. Estimates will be based on DNRC Soil Monitoring (DNRC, 2011).

### Nutrient Cycling

Nutrient cycling, microbial habitat, moisture retention and protection from mineral erosion are provided by coarse and fine woody debris in forested environments (Harmon et al, 1986). Forest management can affect the volumes of fine and coarse woody debris through timber harvesting and result in changes to potentially available nutrients for long-term forest production.

Measurement Criteria: Nutrient cycling will be measured by tons of coarse woody material per acre on harvested sites pre- and post-project.

### Slope Stability

Slope stability can be affected by timber management activities by removing stabilizing vegetation, concentrating runoff, or by increasing the soil moisture. The primary risk areas for slope stability problems include, but are not limited to, landtypes that are prone to soil mass movement, and soils on steep slopes (generally over 60 percent).

Measurement Criteria: Slope stability risk will be measured based on percentage of slopes steeper than 60% with high risk landtypes.

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## Analysis Areas

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### Direct and Secondary and Cumulative Effects Analysis Area

The analysis area for evaluating direct, secondary and cumulative effects to soil physical properties, nutrient cycling and slope stability will include areas proposed for harvest within the gross project area. Analysis area for existing conditions and slope stability will include DNRC owned land within the Ferndale project area. A map of the Landtypes in the Ferndale project area is found below in **Figure S-1**.

**Figure S-1 – Ferndale Landtype Map**



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## Analysis Methods

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### Physical Disturbance (Compaction and Displacement)

Impacts to soil physical disturbance will be analyzed by evaluating the current levels of soil disturbance in the proposed project area based on field review and aerial photo review of existing and proposed harvest units. Percent of area affected is determined through pace transects, measurement, aerial photo interpretation, and GIS to determine skid trail spacing and skid trail width. From this, skid trail density and percent of area impacted are determined. Estimated effects of proposed ground-based and cable yarding activities will be assessed based on findings of DNRC soil monitoring (DNRC, 2011). Soil erosion potential will be measured using the K-value as determined by the NRCS (1996). A description of the K-value and its associated interpretations is found in **Table S3**.

### Nutrient Cycling

Nutrient cycling will be analyzed by disclosing existing levels of coarse woody debris from transects conducted during field reconnaissance. The method for quantifying the coarse woody debris is described in the *Handbook for Inventorying Downed Woody Material* (Brown, 1974). Potential impacts to nutrient cycling will be assessed by evaluating risks to nutrient pools and long-term site productivity from timber sale contract requirements and mitigation measures.

### Slope Stability

Slope stability risk factors will be analyzed by reviewing the Web Soil Survey to identify landtypes listed as high risk for mass movement. Field reconnaissance will also be used to identify any slopes greater than 60 percent as an elevated risk for mass movement.

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## Existing Conditions

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### Geology

The landform and parent materials in the project area are generally quartzite and argillite bedrock soils with small areas of glacial till or glacial drift influence. The majority of the bedrock consists of slightly metamorphosed sedimentary rocks formed from sand, silt, clay, and carbonate materials deposited in an ancient shallow sea during the Precambrian period.

### Physical Disturbance (Compaction and Displacement)

Soil physical disturbance can be affected through management activities. In the gross project area, DNRC has conducted timber harvesting since the 1920s in portions of the project area, since the 1940s in most of the area, and has most recently conducted timber harvesting in the late 1980s. Timber sale records dating back to the 1980s indicate that portions of section 4 of the proposed project area has been harvested using ground-based yarding methods. Ground-based yarding can create soil impacts through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Existing skid trails are spaced at between 60 and 120 feet apart, and none were identified as erosion or sediment sources. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from freeze-thaw cycles and root penetration. Based on pace transects of trail spacing, knife penetration tests for compaction, and ocular estimates of

revegetation, approximately 10% of previously ground-skidded harvest units are in an impacted condition in the proposed project area.

**Table S3 – Soil Map Unit Description**

Map Unit	Description	Acres	Analysis Area	Landtype Description	Compaction hazard	Erosion Hazard	Displacement Hazard
29	Courville gravelly silt loam, 15-30 %	9.8		Moraines, Volcanic ash over glacial till	M	L	L
30	Courville gravelly silt loam, 30-60%	5.3		Moraines, Volcanic ash over glacial till	M	L	L
34	Courville-Rumblecreek complex, 8-30 %	27.8		Moraines, Volcanic ash over glacial till	M	L	L
68	Glaciercreek gravelly silt loam, 2-4%	369.8		Outwash plains, stream terraces; Volcanic ash over outwash	M	L	L
69	Half Moon silt loam, 2-4%	60.5		Outwash plains, Glaciolacustrine deposits	H	H	H
151	Rumblecreek gravelly loam, 8-15%	6.6		Moraines, Glacial till	M	L	H
152	Rumblecreek gravelly loam, 15-30%	92.3		Moraines, Glacial till	M	L	H
153	Rumblecreek gravelly loam, 30-60%	124.7		Moraines, Glacial till	M	L	H
186	Winkler very gravelly loam, cool, 30-60%	116.5		Mountains, Colluvium	M	L	L

### Erosion

No areas of soil erosion were identified during field reconnaissance in 2018 by a DNRC hydrologist. Upland areas harvested during previous entries were found to be stable, well-vegetated and not actively eroding. Erosion from existing road surfaces has been analyzed in the watershed and hydrology analysis.

### Nutrient Cycling

Nutrient cycling was assessed in the proposed project area by completing 9 transects to estimate the current levels of coarse woody debris. These transects were focused on proposed harvest units. The average coarse woody debris is 4.2 tons/acre, with a range of 0.0 to 12.6 tons/acre and a median of 3.0 tons/acre. These results are generally below the recommended range discussed in *Managing Coarse Woody Debris in Forests of the Rocky Mountains* (Graham et. al., 1994) on similar habitat types, with most transects below the 5 tons/acre level. These grand fir and Douglas-fir habitat types in Montana are recommended to have a range of 5 to 14 tons/acre to maintain forest productivity.

### Slope Stability

Soil types in the project area are primarily gentle to moderately sloped (0-60%) residual soils and glacially derived soils found on hilly terrain. The Web Soil Survey reports the findings in the *Lake County Area, Montana (MT629)* (NRCS, 1998) soil survey. This survey identified no areas of soils at high risk for mass movements in the project area. No slope failures were identified during reconnaissance in the proposed project area. Because none of the slope stability risk factors are present in any parcel of the proposed project

area, slope stability will not be evaluated on this project in the remainder of this analysis. A list of soil map units found in the Ferndale project area and their associated management implications is found in **Table S-3**.

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## Environmental Effects

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### **No Action Alternative: Direct, Secondary, and Cumulative Effects**

Implementation of the no-action alternative would result in no soil resource impacts in the project area. Soil resource condition would remain similar to those described in the existing conditions sections of this environmental assessment.

### **Action Alternative: Direct, Secondary, and Cumulative Effects**

#### **Geology**

##### ***Direct and Secondary & Cumulative***

The geology would remain similar to those described in the existing conditions sections of this environmental assessment.

#### **Physical Disturbance (Compaction and Displacement)**

##### ***Direct and Secondary***

Based on DNRC soil monitoring on soils and sites similar to those found in the project area, direct impacts to soil physical disturbance would be expected on up to 89 of the total 665 acres proposed for harvesting in the proposed project area. Soil monitoring conducted on DNRC lands statewide on similar soils with ground-based machinery had a range of impacts from 0 to 33.0 percent of the acres treated, with an average disturbance rate of 13.4% (DNRC, 2011). These impacts include operations on dry soils in non-winter conditions. As a result, the extent of impacts expected would likely be similar to those reported by DNRC soil monitoring (DNRC, 2011), or approximately 0 to 33.0 percent of ground-based harvested acres. The proposal includes ground-based mechanical harvesting on all 665 acres of the proposal.

Ground-based site preparation would be done on tractor units, and prescribed fire may be used for site preparation on portions of cable harvest units. These activities would also generate direct impacts to the soil physical disturbance. Site-preparation disturbance would be intentionally done, and these impacts are considered light and promote reforestation of the site. The combination of these activities would leave approximately 13.4 percent of the proposed harvest units in an impacted condition. This level is below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the *SFLMP*, and well within the 20-percent impacted area established as a level of concern in the *SFLMP* (DNRC 1996). This level translates to a low risk of low direct and indirect impacts to soil physical disturbance. These impacts would likely persist for 20-40 years, depending on site specific conditions. In addition, BMPs and a combination of mitigation measures would be implemented to limit the area and degree of soil impacts as noted in ARM 36.11.422 and the *SFLMP* (DNRC, 1996).

##### ***Cumulative***

Cumulative effects to soil physical disturbance may occur from repeated entries into a forest stand where additional ground is impacted by equipment operations. With this alternative, nearly all of the 665 acres proposed for harvesting have had previous ground-based timber sale operations. Existing skid trails where compaction has begun to ameliorate through freeze-thaw cycles and revegetation would return to a higher level of impact due to this alternative. Additional trails may also be required if existing trails are in undesirable locations. Cumulative effects to soil physical disturbance in areas not previously managed would be identical to those displayed in the Direct and Indirect Effects section of this analysis. Cumulative impacts to soil physical properties under the Action Alternative would fall below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the *SFLMP* and are well within the 20-percent impacted area established as a level of concern in the *SFLMP* (DNRC, 1996). This level translates to a low risk of low cumulative impacts to

soil physical properties. These impacts would likely persist for 20-40 years, depending on site specific conditions.

## **Erosion**

### ***Direct and Secondary***

Direct and secondary effects to erosion from the proposed project would include skid trails in ground based harvest areas and new roads. In each of these areas, there is a high risk of low impacts to erosion due to exposure of bare soil. Skid trails and cable yarding corridors would present a short-term risk which would decrease once disturbed areas re-vegetate. New roads would represent a longer term risk due to continued exposure of bare soil on road tread areas. Erosion from roads is addressed in the watershed and hydrology portion of the analysis.

### ***Cumulative***

Cumulative effects to erosion would be similar to the values reported for soil disturbance. Approximately 13.4% of the proposed harvest units would have exposed soil following activity. These areas of disturbance present a low risk of low impacts to erosion and subsequent sediment delivery due to implementation of all applicable BMPs and mitigations listed in this analysis and in the watershed and hydrology analysis.

Table S4 – Detrimental Soil Disturbance for the Action Alternative

Area of Analysis	Total Area (Acres)	Disturbance Rate (%)	Affected Area (Acres)
Harvest Units (including landings)	665	13.4	89
Roads *	1.8	100.0	1.8

\* Road acreage calculated based on average clear-limit width of 25'

## **Nutrient Cycling**

### ***Direct and Secondary***

Direct and indirect effects to nutrient cycling would include an increase in coarse woody debris from the Action Alternative. This would present a low risk of low direct and indirect effects to nutrient cycling. Stands where woody debris levels are low would see an increase in large woody debris as a result of the proposed harvesting. In addition, this alternative would lead to an increase in fine woody material in the form of limbs and tree tops being left after harvest. Through the timber sale contract, approximately 5-14 tons of coarse woody material would be left on the ground following harvesting activities, as well as fine material for nutrient retention.

### ***Cumulative***

Risk of cumulative effects to nutrient cycling from nutrient pool loss would be low. This would present a low risk of low cumulative effects to nutrient cycling. This alternative would follow research recommendations found in Graham (1994) for retention of coarse and fine woody debris through contract clauses and site-specific mitigation measures.

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## **Soils Mitigations**

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- Limit equipment operations to periods when soils are dry (less than 20% oven-dried weight), frozen or snow-covered in order to minimize soil compaction and rutting, and to maintain drainage features. Check soil moisture conditions prior to equipment start-up.
- On ground-based units, the logger and sale administrator would agree to a skidding plan prior to equipment operations. Skid trail planning would identify which existing trails to use and how many additional trails are needed.
- Do not use existing trails if they are located in draw bottoms or other unfavorable locations.



- Grass seeding or other erosion control measures may be required to stabilize some trails.
- Limit ground-based operations to slopes less than 40% unless they can be used without causing excessive displacement or erosion.
- Keep skid trails to 20 percent or less of the harvest unit acreage. Provide for surface drainage of all roads and skid trails concurrent with operations.
- Slash disposal: Limit the total of disturbance and scarification to 30-40 percent of harvest units.
- Limit dozer piling to slopes less than 35 percent and limit excavator piling to slopes less than 40 percent unless it can be completed without causing excessive erosion.
- Retain between 5 and 14 tons/acre of woody debris 3-inches in diameter or greater (depending on habitat type) and a feasible majority of fine branches and needles following harvesting operations. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves fine slash on site; 2) for whole-tree harvesting, return skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

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### Soils References

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Brown, J. K. 1974. *Handbook for Inventorying Downed Woody Material*. In: USDA and Forest Service (editors). Ogden, Utah: Intermountain Forest and Range Experiment Station.

DNRC, 2011. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT.

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Graham, R. T., A. E. Harvey, M. F. Jurgensen, T. B. Jain, J. R. Tonn and D. S. Page-Dumroese. 1994. Managing Coarse Woody Debris in Forests of the Rocky Mountains. USDA Forest Service Research Paper. INT-RP-447. 13 pp.

NRCS, 1998. MT629-Soil Survey of Lake County Area, Montana. United States Department of Agriculture Natural Resources Conservation Service.

## **Attachment D – Hydrology**

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## Ferndale Timber Sale – Water Resources Analysis

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### Analysis Prepared By:

Name: Tony Nelson

Title: Hydrologist, Montana DNRC

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## Introduction

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The following analysis will disclose anticipated effects to water resources within the Ferndale project area. Direct, secondary, and cumulative effects to water resources of both the No-Action and Action alternatives will be analyzed.

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## Issues and Measurement Criteria

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The following issues encompass the specific issues and concerns raised through public comment and scoping of the proposed project. For a specific list of individual comments and concerns, please refer to the project file.

### ***Sediment Delivery***

Sediment delivery and subsequent water-quality impacts can occur as a result of timber harvesting and related activities, such as road construction and log yarding to landings. Construction of roads, skid trails and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosive power of stream flows.

Measurement Criteria: Sediment from roads, harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP field reviews.

### ***Water Yield***

Water yield can be affected by timber harvesting and associated activities by affecting the timing, distribution and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal (*Haupt 1976*), because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Water yield is further affected because canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt. Water yield impacts are ameliorated as new trees begin to grow and use water. New growth also begins to return snowpack distribution to pre-harvest levels as stands grow. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition. Vegetation removal can also reduce peak flows by changing the timing of snowmelt. Openings will melt earlier in the spring with solar radiation and have less snow available in late spring when temperatures are warm. This effect can reduce the synchronization of snowmelt runoff and lower peak flows.

Measurement criteria: The water yield increase for the project area streams was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns and stream channel stability within the Ferndale project area were used to assess the impacts of past management to water yield. Aerial photo interpretation was used to determine the extent of past management in these watersheds.

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## Regulatory Framework

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The following plans, rules, and practices have guided this projects planning and/or will be implemented during project activities:

### ***Montana Surface Water Quality Standards***

According to ARM 17.30.609 (1)(a), this portion of the Flathead River drainage including the Swan River, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases in turbidity. "Naturally occurring," as defined by ARM 17.30.602 (19), includes conditions or materials present during runoff from developed land where all reasonable land, soil and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. These practices include but are not limited to structural and non-structural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that may impact the resource.

There are several surface water rights within the proposed project area, mainly in Section 4 of the proposed project area, and one in Section 10. Surface water rights include stock watering and domestic use.

Designated beneficial uses in the proposed project area may include cold water fisheries and recreation. No other beneficial water uses were identified due to a lack of stream channels or lack of delivery to downstream waters.

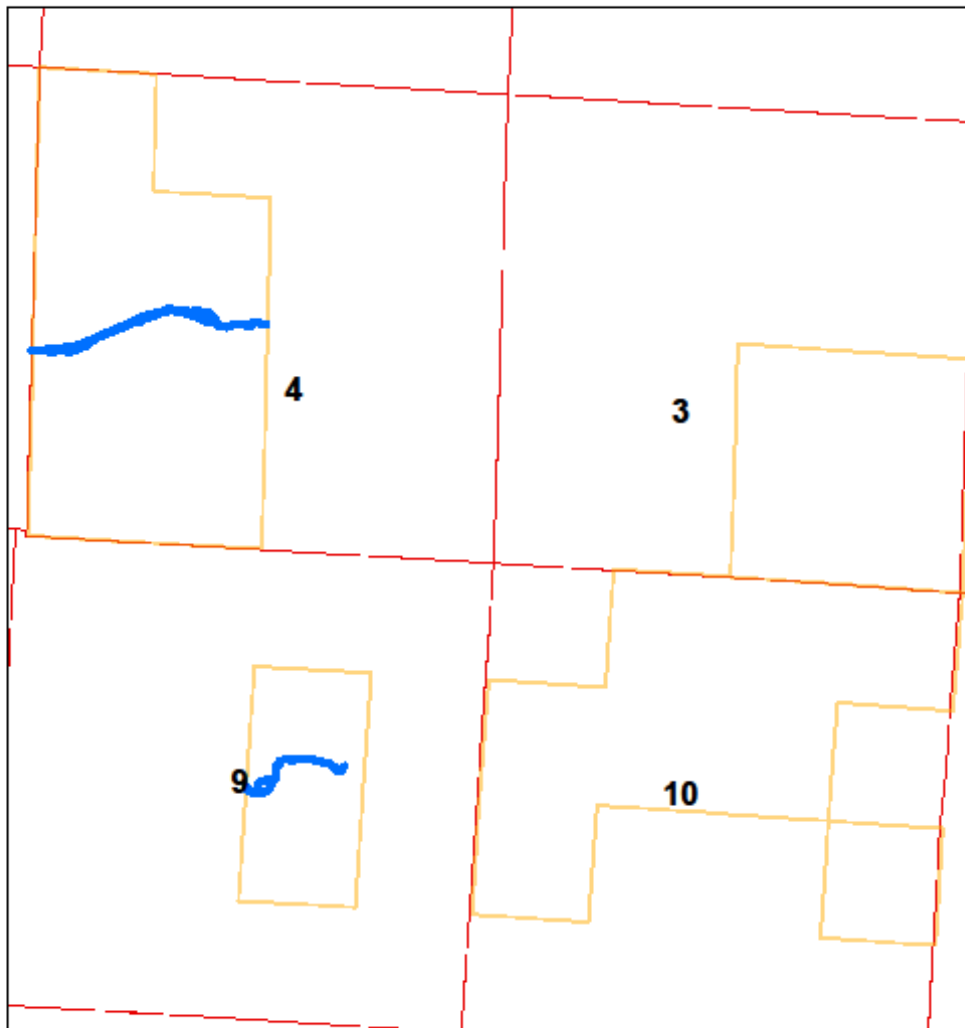
### ***Water Quality Limited Waterbodies***

None of the streams within the project area, including Carney Creek, are listed in the 2018 Montana's Water Quality Integrated Report (305b) publication produced by the Montana Department of Environmental Quality (DEQ, 2018). This list is compiled by the Montana Department of Environmental Quality (DEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130).

### ***Montana Streamside Management Zone (SMZ) Law***

For a map of the streams and their SMZ classification, please refer to **Figure H-1**. By the definition in ARM 36.11.312(3), two perennial tributaries to Carney Creek, one in section 4 of the proposed project area and one in section 9 are class 1 streams since they flow more than 6 months per year and likely contribute flow to Carney Creek. No fish were identified in any of these streams during field reconnaissance, but due to their perennial connection to a fish-bearing stream, it is possible that these streams serve as rearing habitat for fish. All other drainage features found within the proposed project area did not meet the definition of a stream in ARM 36.11.312(20), and are classified as ephemeral draws and swales with no defined channel.

### ***Figure H-1 – Ferndale Project Area Steams***



**Legend**

- Class 1 SMZ
- Ferndale Project Area

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**Analysis Areas**

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*Sediment Delivery*

Analysis area for direct, indirect and cumulative effects to sediment delivery will be analyzed on all existing roads in and leading to the proposed project area. Sediment delivery will be analyzed qualitatively where stream crossings exist within the proposed project area using visual inspection and lineal measurement to determine the road surface area delivering to a stream. Additional sites on proposed haul routes located outside the project area will be assessed qualitatively for their potential to affect downstream water.

### ***Water Yield***

Direct, indirect and cumulative effects to water yield will be analyzed in the stream systems within the project area. A map of the project area and the streams found within the project area is found in **Figure H-1**. All existing activities on all ownership and proposed activities related to the Ferndale project will be analyzed using methods described above. These drainages were chosen as an appropriate scale of analysis, and will effectively display the estimated impacts of proposed activities.

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## **Analysis Methods**

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Where risk is assessed in both sediment-delivery and water-yield analyses, the following definitions apply to the level of risk reported:

- low risk means that impacts are unlikely to result from proposed activities,
- moderate risk means that there is approximately a 50-percent chance of impacts resulting from proposed activities, and
- high risk means that impacts are likely to result from proposed activities.

Where levels or degrees of impacts are assessed in this analysis, the following definitions apply to the degree of impacts reported:

- very low impact means that impacts from proposed activities are unlikely to be measurable or detectable and are not likely to be detrimental to the water resource;
- low impact means that impacts from proposed activities would likely be measurable or detectable, but are not likely to be detrimental to the water resource;
- moderate impact means that impacts from proposed activities would likely be measurable or detectable, and may or may not be detrimental to the water resource;
- high impact means that impacts from proposed activities would likely be measurable or detectable, and are likely to have detrimental impacts to the water resource.

### ***Sediment Delivery***

Analysis methods to assess sediment delivery will include qualitative assessments where stream crossings exist within the proposed project area using visual inspection and lineal measurement to determine the road surface area delivering to a stream. Sediment from roads, harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP field reviews.

### ***Water Yield***

Analysis methods to assess water yield increases for the project area streams was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns and stream channel stability within the Ferndale project area were used to assess the impacts of past management to water yield. All existing activities on all ownership within project area watersheds and proposed activities related to the Ferndale project will be analyzed using methods described above.

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## **Existing Conditions**

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## General Description

The following section will describe the existing conditions within the proposed project area and the analysis areas that are relevant to the issues discussed above in this analysis.

## Sediment Delivery

Sediment delivery on this parcel was reviewed by a DNRC hydrologist in 2018. Two stream channels were identified in the project area. All are perennial class 1 tributaries to Carney Creek. One is located in section 4 of the proposed project area, and the other is found in section 9. In the section 4 parcel, the stream flows from west to east through the center of the parcel and has an approximately 3-foot bankfull width. The stream was classified as a B3/4 channel using a classification system developed by *Rosgen (1996)*. Channel types rated as “B” are typically in the 2- to 4-percent gradient range, and have a moderate degree of meander (sinuosity). Channel-bed materials in B3/4 types are mainly cobble and gravel. In section 9 a stream system was identified that flows from west to east through the parcel. It has an approximately 3-foot bankfull width. The stream was classified as a B4 channel using a classification system developed by *Rosgen (1996)*. Channel types rated as “B” are typically in the 2- to 4-percent gradient range and have a moderate degree of meander (sinuosity). Channel-bed materials in B4 types are mainly gravel. No areas of unstable or actively down-cut channels were identified during field reconnaissance. Large woody debris was found in adequate supply to support channel form and function. Woody material in a stream provides traps for sediment storage and gradient breaks to reduce erosive energy and work as flow deflectors to reduce bank erosion. No evidence of past SMZ harvesting was found. Based on these findings, no in-channel sources of erosion or deposition were identified in project area stream reaches.

No sediment delivery from the existing road system was identified on any of the proposed haul routes within or leading to the project area. The existing road system in the proposed project area is low to moderate standard native-surfaced road, and most reaches meet applicable best management practices for surface drainage and erosion control. Road surfaces are partially vegetated with grass/forbs and are not actively eroding. Portions of the road system in sections 3 and 10 of the proposed project have isolated reaches where the road is the low point, making it difficult to route runoff away from the road. These areas may remain wet for longer periods of the year due to lack of surface drainage. Improvements to BMPs at specific sites may be required prior to use. Most road grades are generally under 8%. The road system was constructed to access timber harvesting by Montana DNRC during past entries. Most of the road segments in the project area are not causing active erosion or sediment delivery to streams.

## Water Yield

No water yield impacts were identified from past activities in and around the proposed project area streams. Past management activities in and around the project area consist of timber management on adjacent land private ownership, land managed by the Flathead National Forest and state land. These activities and events have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of these parcels, it was determined that a detailed water yield analysis would not be necessary for this project. The surrounding area has historically had substantial levels of harvest activity, however in the class 1 channels in the proposed project area, there were no impacts apparent as a result of water yield increases. In addition, a majority of the past harvesting in these small drainages occurred

more than 20 years ago, and new trees are actively growing, and water use by the forest canopy is moving closer to pre-harvest conditions. No adverse impacts were identified in Carney Creek from water yield increases or in-channel adjustments. All stream channels identified within the proposed project area were stable and showing no signs of impacts from water yield increases. After evaluating the watershed cumulative effects risks along with the current conditions in the Ferndale project area, by ARM 36.11.423, a detailed watershed analysis is not needed in this project area.

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## Environmental Effects

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### **No Action Alternative: Direct, Secondary, and Cumulative Effects**

#### **Sediment Delivery**

##### ***Direct and Secondary***

Under this alternative, no timber harvesting or related activities would occur. Water Quality would continue as described in the existing conditions.

##### ***Cumulative***

No additional cumulative impacts to water quality would be expected. Sediment delivery sites from roads on the proposed haul routes would remain unchanged, as would the sediment sources described in Existing Conditions.

#### **Water Yield**

##### ***Direct and Secondary***

No increased risk of increases or reductions in annual water yield or ECA would result from this alternative.

##### ***Cumulative***

No increase in water yield would be associated with this alternative. As vegetation continues toward a fully forested condition, annual water yields would also be expected to gradually decline.

### **Action Alternative: Direct, Secondary, and Cumulative Effects**

#### **Sediment Delivery**

##### ***Direct and Secondary***

There is a low risk of direct or secondary effects to sediment delivery to streams from the timber harvesting activities proposed in the Action Alternative. The SMZ law, Administrative Rules for Forest Management, Riparian Management Zones (RMZ), channel migration zones (CMZ) on fish-bearing Class 1 streams, and applicable BMPs would be applied to all harvesting activities, which would minimize the risk of sediment delivery to draws and streams. The Montana BMP audit process has been used to evaluate the application and effectiveness of forest-management BMPs since 1990; this process has also been used to evaluate the application and effectiveness of the SMZ Law since 1996. During that time, evaluation of ground-based-skidding practices near riparian areas has been rated 92-percent effective, and these same practices have been found effective over 99 percent of the time from 1998 to present (*DNRC 1990 through 2012*). Since 1996, effectiveness of the SMZ width has been rated over 99 percent (*DNRC 1990 through 2012*). As a result, with the application of BMPs and the SMZ Law, proposed activities are expected to have a low risk of low impacts to sediment delivery.

There is a low risk of direct or secondary effects to sediment delivery to streams from the use of existing roads proposed in the Action Alternative. The existing road system would be brought up to BMP standards on reaches that do not currently meet BMPs, and no direct sources of sediment delivery were identified. Portions of existing road in sections 3 and 10 of the project area where the road is the low point may be lifted or shifted



to locations where surface runoff can be routed away from the road. None of these road reaches are located near a stream, so there is a low risk of sediment delivery from any of these activities.

There is a moderate risk of low impacts to sediment delivery from construction of approximately 0.6 miles of new temporary road. This risk would be elevated due to exposure of bare soil in order to construct roads. One new stream crossing is proposed with this project on the stream in section 9 of the project area. This crossing would install a 20-foot cross-laminated timber (CLT) bridge across the 3-foot bankfull channel to access timber on the north side of the stream. The CLT bridge would entirely span the channel, and no disturbance to the bed or banks of the stream are expected. All applicable BMPs would be applied to all construction, including the CLT crossing. The risk of sediment delivery would remain elevated for 2-3 years after project completion while bare soils are re-vegetated.

#### ***Cumulative***

Risk of sediment delivery and sediment loading to Carney Creek and waters downstream from the proposed project area would be slightly increased from current levels in the short term and below current levels in the long term. Maintenance and improvement of existing erosion control and surface drainage on the existing road system would yield similar erosion rates to current levels. Overall, there is a low risk of short-term low-level increases in sediment loading for about 2-3 years. However, water quality standards are expected to be met and there is a low risk of impacts to beneficial uses.

#### **Water Yield**

##### ***Direct and Secondary***

There is a low risk of very low direct or secondary effects to water yield from harvesting of approximately 665 acres of timber under this alternative within the proposed project area. It is a low risk that this level of harvesting would be sufficient to generate measurable increases in water yield in any streams located within or near the project area or cause channel instability. The stability of channels would be sufficient to handle any anticipated increases without measurable change. As a result, there is a low risk of very low direct or secondary impacts to water yield in project area drainages as a result of the proposed Action Alternative.

#### ***Cumulative***

There is a low risk of very low cumulative effects to project area drainages and downstream waters in and near the project area as a result of the proposed project. The proposed harvesting is not expected to have any measurable or observable impacts to water yield in the Carney Creek watershed. Therefore potential increases in water yield from harvest activities have a very low risk to affect downstream waters.

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## **Water Resources Mitigations**

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Hydrologic related resource mitigations that would be implemented with the proposed Action Alternative include:

- implement Riparian Management Zones on all class 1 streams based on site-potential tree heights in the project area
- implement BMPs on all newly constructed roads and improve BMPs on existing roads where needed
- use spot-blading on existing roads to preserve as much of the existing vegetative cover as possible on vegetated road surfaces

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## **Water Resources References**

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Missoula, Montana.

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, Montana.

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Haupt, H.F., et al. 1974. *Forest Hydrology Part II Hydrologic Effects of Vegetation Manipulation*. USDA Forest Service, Region 1. Missoula, MT.

Montana Department of Environmental Quality. "Clean Water Act Information Center." 30 January, 2017. < <http://deq.mt.gov/Water/WQPB/cwaic>>

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## **Attachment E – Wildlife**

## Ferndale Timber Sale – Wildlife Analysis

### Analysis Prepared By:

**Name: Leah Breidinger**

**Title: Wildlife Biologist, Montana DNRC**

## Introduction

The following analysis will disclose the anticipated direct, secondary, and cumulative effects to wildlife associated with the No-Action and Action alternatives.

## Issues

- Mature forest cover and connectivity. The proposed activities could decrease mature forested cover, which could reduce habitat connectivity and suitability for wildlife species associated with mature forests.
- Old-growth forests. The proposed activities could affect wildlife species associated with old-growth forests by reducing habitat availability and increasing fragmentation.
- Canada lynx. The proposed activities could reduce landscape connectivity and the availability of suitable Canada lynx habitat, reducing the capacity of the area to support Canada lynx.
- Grizzly bears. The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats, and/or by increasing risk of human-caused bear mortality.
- Fishers. The proposed activities could reduce the availability and connectivity of suitable fisher habitat and increase human access, which could reduce fisher habitat suitability and increase trapping mortality.
- Pileated woodpeckers. The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers.
- Big game winter range. The proposed activities could reduce cover, which could reduce the quality of big game winter range habitat.

## Regulatory Framework

The following plans, rules, and practices have guided this project's planning and/or will be implemented during project activities: *DNRC Forest Management Rules*, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan (USFWS and DNRC 2010)*, *the Endangered Species Act*, *the Migratory Bird Treaty Act*, and *the Bald and Golden Eagle Protection Act*.

## Analysis Areas

### Direct and Secondary Effects Analysis Area

The direct and secondary effects of the proposed activities on all species/issues were analyzed within the Project Area (*TABLE WI-1, FIGURE WI-1*).

### Cumulative Effects Analysis Areas

The cumulative effects of the proposed activities on all species/issues were analyzed at a broad surrounding landscape scale that varies according to the issue or wildlife species being discussed. Cumulative effects analysis areas are named according to the size of the area and are summarized in *TABLE WI-1* and *FIGURE WI-1*. Cumulative effects analysis areas (CEAAs) include the Project Area as well as lands managed by other agencies and private landowners. The Medium and Large CEAAs are managed primarily by private landowners with 73% and 59% of the Medium and Large CEAAs, respectively, managed by private

landowners. Most of the valley bottom is under private ownership intermixed with DNRC and Stoltze lands. Forest service lands are located on the west side of the CEAA in the Mission Mountains. The elevation of the CEAA ranges from 2,900 to 5,300 feet. Detailed descriptions of each analysis area are in the affected environment section for each issue or species evaluated (e.g., pileated woodpecker etc.).

**Table WI-1– Descriptions of the Project Area and cumulative effects analysis areas.**

Analysis Area Name	Description	Total Acres	Issues/Species Analyzed
Project Area	DNRC managed lands in T26N R19W Sections 3, 4, 9, 10.	734	Direct & secondary effects for all issues/species
Medium CEAA	The Project Area and surrounding sections; defined by streams, ridgelines, and topographic features	7,769	mature forest cover & connectivity, old-growth forests, fishers, pileated woodpeckers, big game
Large CEAA	The north end of the Mission Mountains and portions of the Swan River Valley near Ferndale.	28,392	Canada lynx, grizzly bears

### Analysis Methods

Analysis methods are based on the DNRC State Forest Land Management Plan, which is designed to promote biodiversity. The primary basis for this analysis includes information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with professionals. The coarse-filter wildlife analysis section includes analyses of the direct, secondary, and cumulative effects of the proposed alternatives on old-growth forest and the connectivity of mature forest habitats.

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by the Montana Department of Fish Wildlife and Parks (DFWP).

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Recent projects (≤10 years) that could contribute to cumulative effects are summarized in the following table.

**Table WI-2 – Recent projects and known proposed projects that could contribute to cumulative effects and the number of harvested acres that occur in each analysis area. Values in parentheses indicate the approximate percentage (%) of area the respective lands represent of each of the analysis areas listed in the table.**

Sale Name	Agency	Harvest Year	Project Area	Medium CEAA	Large CEAA
Bug Creek	USFS	Proposed 2018	0 (0%)	498 (6.4%)	1,929 (6.8%)

The Bug Creek project, which was proposed by the USFS in January 2018, is in the development phase and final acreage and treatments may change following input from the public. Prescriptions for individual units vary and additional information on the proposal may be located on the project webpage:

<https://www.fs.usda.gov/project/?project=47327>

## Coarse Filter Wildlife Analysis

### MATURE FOREST COVER AND CONNECTIVITY

#### Issue

The proposed activities could decrease mature forested cover, which could reduce habitat connectivity and suitability for wildlife species associated with mature forests.

#### Introduction

Mature forests characterized by large-diameter trees and dense canopy cover provide many wildlife species with food, shelter, breeding sites, and travel corridors. Historically, the spatial configuration of mature forested habitat in the western United States was shaped by natural disturbance, primarily wildfire, blowdown, and pest outbreaks. These events resulted in a mosaic-like spatial configuration of forest patches varying in age, species composition, and development. Spatial configuration, including patch size and connectivity of forested habitat, is important for many wildlife species. Patch size may affect the distribution of wildlife species that are attracted to or avoid forest edges. Additionally, connectivity of mature forested habitat may facilitate movements of wildlife species that avoid openings in canopy cover. For example, discontinuous mature forested habitat would negatively affect movements of fisher, which avoid large openings in canopy cover. Timber harvest, like wildfire and blowdown, is a disturbance event that often creates open patches of young, early-successional habitats. Forest management considerations for wildlife species dependent on mature forested habitat include providing well-connected patches of habitat with  $\geq 40\%$  canopy cover.

#### Analysis Area

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Medium CEAA is defined by geographic features and provides a reasonable analysis area to assess the impact of the proposed activities on wildlife species in the vicinity of the Project Area.

#### Measurement Criteria

Factors considered in the analysis include: 1) the degree of timber harvesting, 2) availability and patch size of mature forested habitat ( $\geq 40\%$  canopy cover, trees  $> 9$  inches dbh average), 3) open and restricted road density, and 4) the availability of potential travel corridors. Mature forested habitat is defined here and in the remainder of the document as forest stands with  $\geq 40\%$  canopy cover comprised primarily of trees that are on average  $> 9$  inches dbh. Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of wildlife species that benefit from well-connected mature forest conditions.

#### Affected Environment

The Project Area currently contains approximately 677 acres of mature stands composed primarily of western larch and Douglas-fir stands with some grand fir, western red cedar and Engelmann spruce (*TABLE WI-3*, *FIGURE WI-2*). This habitat is continuous, thus connectivity of mature forests for wildlife is high across the Project Area. The remaining acres consist of old patch cuts in Section 4 that contain a high density of young aspen trees, riparian areas associated with Carney Creek, and small meadows. The Project Area does not occur in any particular area of documented importance for habitat connectivity; however, Carney Creek flows through some of the parcels, which may provide a

connectivity corridor for wildlife. Open roads are common in the valley bottom and access residential areas and a boat launch on Loon Lake. However, overall open road density is low at 1.1 miles/square mile on DNRC lands.

The Medium CEAA consists primarily of private lands in the valley bottom with USFS lands located higher in the Mission Mountains and contains a high amount of mature forested habitat (*TABLE WI-3*). The largest patch is in the Mission Mountains on USFS and DNRC lands with smaller patches scattered in the valley bottoms between residences. Overall, connectivity of mature forested habitat is high on the west side of the analysis area and low on the east side of the analysis area in the valley between Carney Creek and the Swan River although corridors exist on DNRC and private lands near Horseshoe and Loon Lakes (*FIGURE WI-2*). Open road density is high in the Medium CEAA at 3.4 miles/square mile, likely reducing connectivity for wildlife species that avoid roads.

**Table WI-3— Average patch size and acreage of mature forested habitat (≥40% canopy cover, >9 inches dbh) pre- and post-harvest in the Project Area and Medium CEAA for the Ferndale Timber Sale. Percent of the total corresponding analysis area is in parentheses.**

Mature Forest Attribute	Project Area		Medium CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Acres of mature forest	677 (92%)	199 (27%)	4,796 (63%)	4,316 (56%)
Average patch size (acres)	169	50	178	149
Number of patches	4	4	27	29

### **Environmental Effects – Mature Forest Cover and Connectivity**

#### **No Action Alternative: Direct, Secondary, and Cumulative Effects**

None of the proposed forest management activities would occur on DNRC lands. In the short-term, no changes to the amount, quality, or spatial arrangement of mature forested habitat would occur. In the long-term and in the absence of natural disturbance, the availability and connectivity of mature forested wildlife habitat may increase as stands age.

#### **Action Alternative: Direct and Secondary Effects**

The proposed activities would occur in 627 (93%) of the 677 acres of mature stands available in the Project Area, some of which would continue providing mature forested habitat, albeit at a reduced stand density (*TABLE WI-3*, *FIGURE WI-2*). Approximately 149 acres of stands treated with old-growth maintenance and commercial thin cuts would retain 40-60% mature canopy cover post-harvest. The remaining 478 acres would be treated with shelterwood and overstory removal cuts would retain 5-30% mature canopy cover post-harvest. Riparian habitat would not be harvested. Considering the amount of habitat removal, connectivity of upland mature canopy forest within the Project Area would be reduced, particularly in Section 3 where shelterwood treatments would be applied. However, a large corridor would be retained between Carney Creek and USFS habitat in Section 4 and riparian corridors would also remain in Section 9. Approximately 0.6 miles of temporary roads would be constructed, but they would be removed post-harvest. Thus, since: 1) the abundance of mature forested habitat would decrease by 478 acres (70.6% of existing mature forest); 2) the canopy cover in an additional 149 acres of mature forested habitat would be reduced from 50-80% to 40-60%; 3) connectivity would be reduced, particularly in and around Section 3; and 4) 0.6 miles of temporary roads would be constructed, but post-harvest road density would not change; moderate adverse direct or secondary effects to mature forested habitat abundance, suitability, or connectivity would be anticipated as a result of the Action Alternative.

#### **Action Alternative: Cumulative Effects**

The proposed activities would affect 627 acres of the 4,796 acres (13%) of mature forested habitat available in the Medium CEAA. Post-harvest, 478 of these acres would not provide mature forested habitat for wildlife,

causing average patch size to decrease (*TABLE WI-3, FIGURE WI-2*). No riparian habitat harvest would occur. Overall, mature forested habitat would remain connected although connectivity between Carney Creek and the Swan River would be reduced due to the logging proposed in Section 3. Approximately 0.6 miles of temporary road would be constructed, but these roads would be closed post-harvest and road density would not change. Reductions in the availability of suitable mature forested habitat would be additive to harvest activities that are proposed or ongoing in the Medium CEAA including the proposed USFS Bug Creek Timber Sale which would impact approximately 498 acres in the Medium CEAA. The Bug Creek Timber Sale Project proposes a variety of treatments including seed tree and commercial thin treatments which would have varying impacts on mature canopy cover. Thus, since: 1) the abundance of mature forested habitat in the Medium CEAA would decrease by 478 acres (10% of existing mature forest); 2) an additional 149 acres (3%) would be logged but would continue providing mature forested habitat post-harvest; 3) mature forest fragmentation would increase particularly between Carney Creek and the Swan River; and 4) 0.6 miles of temporary roads would be constructed, but total road density would not change; minor adverse cumulative effects to mature forested habitat abundance, suitability, or connectivity would be anticipated as a result of the Action Alternative.

## **OLD-GROWTH FORESTS**

### **Issue**

The proposed activities could affect wildlife species associated with old-growth forests by reducing habitat availability and increasing fragmentation.

### **Introduction**

Old-growth forests are an important component of biological diversity. Old-growth forest stands typically contain various combinations of large old trees, abundant snags and downed logs, and multiple canopy layers, which are typically not found in young forests. These attributes provide structures used by a diversity of wildlife species. The diversity of species and the complexity of interactions between them can be different than in earlier successional stages (*Warren 1990*). Of the 48 old-growth associated species occurring in the Northern Rockies, about 60% may require stands larger than 80 acres (*Harger 1978*). Smaller patches may be unsuitable for wildlife species with large home ranges. Additionally, small, less-mobile species may be at greater risk of local extinction in small patches/habitat islands. Timber harvest can affect the size, availability, and spatial juxtaposition of old-growth stands.

### **Analysis Area**

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Medium CEAA is defined by geographic features and provides a reasonable analysis area to assess the impact of the proposed activities on wildlife species in the vicinity of the Project Area.

### **Measurement Criteria**

Old-growth forest stands were identified as described in the Vegetation Analysis. Factors considered in the analysis include: 1) the level of harvesting, 2) the abundance of old-growth, and 3) the abundance of patches >80 acres.

### **Affected Environment**

The Project Area contains approximately 81 acres (11% of Project Area) of stands meeting the definition of old-growth (*Green et al. 1992*). All of these acres are located in one patch in Section 9 and consists of western red cedar stands with some Engelmann spruce, western larch, and Douglas-fir. This old-growth stand is a part of a large stand of mature forest extending upslope into the Mission Mountains (*FIGURE WI-2*).



The Medium CEAA contains 81 acres (1.0% of Medium CEAA) of old-growth stands on DNRC-managed lands. On non-DNRC lands in the Medium CEAA, there are approximately 2,039 acres of mature forested habitat with trees  $\geq 15$  inches dbh, (USFS Vmap v12 data 2012), some of which may be old-growth. Additional old-growth stands are likely present on USFS lands in the Mission Mountains as well as adjacent to riparian areas associated with Carney Creek and small wetlands found throughout the Medium CEAA. Considering that open road density is high at 3.4 miles per square mile, old-growth attributes such as snags have likely been removed in high road density areas, especially in the valley bottom near Ferndale.

### **Environmental Effects – Old-growth Forests**

#### **No Action Alternative: Direct, Secondary, and Cumulative Effects**

No changes to the amounts, quality, or spatial arrangement of old-growth would occur on DNRC lands under this Alternative. Thus, no direct, secondary, or cumulative effects associated with the abundance or fragmentation of old-growth forests would be anticipated as a result of the No-Action Alternative.

#### **Action Alternative: Direct and Secondary Effects**

Approximately 71 acres (88%) of the 81 acres of old-growth forest in the Project Area would be affected by the proposed activities. These acres would be treated with an old-growth maintenance treatment in which decadent western larch and grand fir would be removed to promote continued growth of healthy western red cedar. Additionally, 1-acre patch cuts around healthy western white pine would be used to promote regeneration. Overall, old-growth structural attributes would be maintained in these stands, and they would continue to exceed the minimum threshold old-growth definitions described by Green et al. (1992) (see VEGETATION ANALYSIS). Logging would alter some structural attributes of these old-growth stands and could adversely affect some old-growth-associated species, particularly those preferring dense forest stands; however, the area is likely to continue providing high quality wildlife habitat post-harvest. Patch size would not change. Thus, since 1) the availability of old-growth would not change; 2) stand density would decrease on 71 acres (88% of existing old-growth stands), which may affect wildlife species that prefer dense old-growth stands; and 3) the abundance of old-growth patches  $>80$  acres would not change; minor adverse direct and secondary effects associated with the abundance or fragmentation of old-growth forests would be anticipated as a result of the Action Alternative.

#### **Action Alternative: Cumulative Effects**

Approximately 71 acres of the potential old-growth habitat in the Medium CEAA would be affected by the proposed activities (3.3% of the 2,120 acres of old-growth and mature stands). All of these acres would continue providing old-growth habitat post-harvest, albeit at a reduced stand density. Patch size would not change and the availability of large old-growth patches would not change. Changes in structural attributes of old-growth would be additive to ongoing forest management activities in the Medium CEAA, including the proposed USFS Bug Creek Project (*TABLE WI-2*). However, the project is still in development and information on the amount of old-growth that may be impacted is not available. Thus, since: 1) old-growth availability would not change; 2) stand density would decrease on 71 acres, which may affect wildlife species that prefer dense old-growth stands; and 3) the abundance of patches  $>80$  acres would not be affected; minor adverse cumulative effects associated with the abundance or fragmentation of old-growth forests would be anticipated as a result of the Action Alternative.

## **Fine Filter Wildlife Analysis**

In the fine-filter analysis, individual species of concern are evaluated. These species include those listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and animals managed as big game by Montana DFWP. *TABLE WI-4*—provides an analysis of the anticipated effects for each species.

**Table WI-4 –Anticipated Effects of the Ferndale Timber Sale on wildlife species.**

Species/Habitat	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
<b>Threatened and Endangered Species</b>	
<b>Grizzly bear</b> <i>(Ursus arctos)</i> Habitat: Recovery areas, security from human activity	[Y] <b><i>Detailed Analysis Provided Below.</i></b> The Project Area is in recovery zone habitat as well as non-recovery occupied habitat ( <i>USFWS 1993, Wittinger 2002</i> ).
<b>Canada lynx</b> <i>(Felix lynx)</i> Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	[Y] <b><i>Detailed Analysis Provided Below.</i></b> The Project Area contains approximately 618 acres of suitable lynx habitat.
<b>Sensitive Species</b>	
<b>Bald eagle</b> <i>(Haliaeetus leucocephalus)</i> Habitat: Late-successional forest < 1 mile from open water	[Y] A bald eagle nest is present near Loon Lake. However, all harvest units are located more than 0.5 mile from the most recent nest location and disturbance from logging is anticipated to have a negligible impact on bald eagles considering that the eagles are likely accustomed to mechanized human activity given the presence of many residences in the area. Large emergent snags and perch trees would be retained in harvest units. Additionally, logging would be prohibited from April 1 – July 15 in the proposed harvest unit directly north of Loon Lake, reducing disturbance to bald eagles. Additional timing restrictions would apply if the eagles begin nesting closer to the harvest units.
<b>Black-backed woodpecker</b> <i>(Picoides arcticus)</i> Habitat: Mature to old burned or beetle-infested forest	[N] No recently (<5 years) burned areas occur within 0.25 miles of the Project Area. Thus, no direct, secondary, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
<b>Coeur d'Alene salamander</b> <i>(Plethodon idahoensis)</i> Habitat: Waterfall spray zones, talus near cascading streams	[N] No moist talus or streamside talus habitat occurs in the Project Area. Thus, no direct, secondary, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
<b>Columbian sharp-tailed grouse</b> <i>(Tympanuchus Phasianellus columbianus)</i> Habitat: Grassland, shrubland, riparian, agriculture	[N] No suitable grassland communities occur in the Project Area. Thus, no direct, secondary, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.

Species/Habitat	<b>[Y/N] Potential Impacts and Mitigation Measures</b> <b>N = Not Present or No Impact is Likely to Occur</b> <b>Y = Impacts May Occur (Explain Below)</b>
<b>Common loon</b> <i>(Gavia immer)</i> Habitat: Cold mountain lakes, nest in emergent vegetation	[Y] Loon Lake is located less than 200 feet from a proposed harvest unit. To reduce disturbance to loons that may be nesting on the lake, logging would be prohibited from April 1 – July 15 in this harvest unit. Vegetative screening adjacent to the lake would not be impacted. Thus, negligible adverse direct, secondary, or cumulative effects to common loons would be expected to occur as a result of either alternative.
<b>Fisher</b> <i>(Martes pennanti)</i> Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	[Y] <b>Detailed Analysis Provided Below</b> – Approximately 640 acres of suitable fisher habitat occur within the Project Area.
<b>Flammulated owl</b> <i>(Otus flammeolus)</i> Habitat: Late-successional ponderosa pine and Douglas-fir forest	[Y] <b>Detailed Analysis Provided Below</b> – Approximately 109 acres of flammulated owl habitat types occur in the Project Area.
<b>Gray Wolf</b> <i>(Canis lupus)</i> Habitat: Ample big game populations, security from human activities	[N] Wolves may use habitat near the Project Area. Disturbance associated with timber sales at den and rendezvous locations can adversely affect wolves; however, timing restrictions would apply if den or rendezvous sites are documented ( <i>ARM 33.11.430(1)(a)(b)</i> ). Thus, negligible adverse direct, secondary, or cumulative effects to wolves would be anticipated as a result of the Action Alternative. No direct, secondary, or cumulative effects would be anticipated as a result of the No Action Alternative.
<b>Harlequin duck</b> <i>(Histrionicus histrionicus)</i> Habitat: White-water streams, boulder and cobble substrates	[N] No suitable stream habitat occurs near the Project Area; however, migrating harlequin ducks have been observed near the head of Swan Lake ( <i>MNHP data, October 15, 2018</i> ). The head of Swan Lake is >0.5 miles from the proposed harvest units, thus, no direct, secondary, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.

Species/Habitat	<b>[Y/N] Potential Impacts and Mitigation Measures</b> <b>N = Not Present or No Impact is Likely to Occur</b> <b>Y = Impacts May Occur (Explain Below)</b>
<b>Northern bog lemming</b> <i>(Synaptomys borealis)</i> Habitat: Sphagnum meadows, bogs, fens with thick moss mats	[Y] Suitable sphagnum moss mats and wetlands occur in the Project Area and bog lemming use of the area is possible, although it has not been documented ( <i>MNHP data, October 15, 2018</i> ). To minimize the potential for adverse impacts to bog lemmings, harvest would not occur within 50 feet of wetlands larger than 0.25 acres. Thus, negligible adverse direct, secondary, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
<b>Peregrine falcon</b> <i>(Falco peregrinus)</i> Habitat: Cliff features near open foraging areas and/or wetlands	[N] Although present in the landscape, large cliffs and rock outcrops were not observed in the Project Area or within 0.5 miles of the Project Area. Additionally, peregrine eyries have not been documented near the Project Area ( <i>MNHP data, October 15, 2018</i> ). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
<b>Pileated woodpecker</b> <i>(Dryocopus pileatus)</i> Habitat: Late-successional ponderosa pine and larch-fir forest	[Y] <b>Detailed Analysis Provided Below</b> – Approximately 330 acres of pileated woodpecker habitat occur in the Project Area.
<b>Townsend's big-eared bat</b> <i>(Plecotus townsendii)</i> Habitat: Caves, caverns, old mines	[N] No suitable caves or mine tunnels are known to occur in the Project Area. Thus, no direct, secondary or cumulative effects to Townsend's big-eared bats would be expected to occur as a result of either alternative.
<b>Wolverine</b> <i>(Gulo gulo)</i> Habitat: Alpine tundra and high-elevation boreal forests that maintain deep persistent snow into late spring	[N] No high-elevation habitat with persistent spring snowpack occurs in the Project Area. Occasional wolverine sightings have been reported near the Project Area; however, wolverines are not anticipated to frequent the area give the low-elevation of the area ( <i>MNHP data, October 15, 2018</i> ). Thus, no adverse direct, secondary or cumulative adverse effects to wolverines would be anticipated as a result of either alternative.
<b>Big Game Species</b>	
<b>Elk</b>	[Y] <b>Detailed Analysis Provided Below</b> – The Project Area is considered potential white-tailed deer winter range by DFWP (2008).
<b>Whitetail</b>	
<b>Mule Deer</b>	

## Threatened and Endangered Species

### GRIZZLY BEAR

#### Issue

The proposed activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats, and/or by increasing risk of human-caused bear mortality.

#### Introduction

Grizzly bears are opportunistic omnivores that inhabit a variety of habitats in Montana. Preferred grizzly bear habitat includes avalanche chutes, fire-mediated shrub fields, and riparian areas, all of which provide seasonal food sources (*Servheen 1983, McLellan and Hovey 2001*). Grizzly bears are federally listed as a threatened species and primary threats are related to human-bear conflicts and long-term habitat loss associated with human development (*Mace and Waller 1997*). Forest management considerations for grizzly bears include minimizing potential for conflicts with humans, minimizing adverse effects to vegetation and cover, minimizing access and the construction of new roads, and reducing disturbance levels during the non-denning season, especially in the spring and fall periods when grizzly bears have important nutritional demands.

#### Analysis Area

The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 28,392-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Large CEAA is defined by geographic features and approximates the home range size of a female grizzly bear in northwest Montana.

#### Measurement Criteria

Factors considered in the analysis included: 1) the degree of harvesting, 2) the availability of visual screening cover, 3) risk of displacement from important grizzly bear habitat including spring habitat and riparian habitat, and 4) open and restricted road densities. Visual screening was estimated by evaluating forest stand size class and the total crown density of all trees in the stand using GIS and SLI data. Seedlings/sapling stands were included in estimates of visual screening cover if they were >4 feet tall and contained ≥350 trees/acre. On non-DNRC lands the acreage of stands with ≥40% canopy cover provided by trees >9 inches dbh on average was queried to estimate the availability of visual screening cover.

#### Existing Environment

The Project Area is considered grizzly bear non-recovery occupied associated with the NCDE (*USFWS 1993, Wittinger 2002*). The Project Area does not occur in linkage zones between recovery zones (*Servheen et al. 2003*). However, grizzly bears use the low riparian areas in the Project Area in the spring and may be present in the Project Area at any time. Approximately 628 acres (86% of Project Area) possess cover in amounts capable of providing visual screening for grizzly bears, which would allow grizzly bears to travel freely in the Project Area, should they be present. Riparian habitat can provide important foraging areas for bears, especially in the spring (*Servheen 1983*), and is available in the Project Area along Carney Creek, unnamed tributaries to Carney Creek, and numerous wetlands with preferred bear plants such as skunk cabbage. The area is located at a low elevation and is considered spring habitat. Large berry patches were not observed in the Project Area. Open road density in the Project Area is low at 1 miles/square mile, but the parcels in the valley bottom receive substantial amounts of human use due to the network of trails, presence of the Loon Lake boat launch, and the proximity to many residences associated with Ferndale.

The Large CEAA contains a variety of age classes of forested habitat as well as riparian habitat and wetlands. Low-elevation habitat important for fall and spring foraging is located along Carney Creek and the Swan River and higher elevation habitat located in the western portion of the analysis area may provide summer range habitat depending upon the availability of berry crops. Hiding cover is present in at least 14,251 acres (50% of the Large CEAA). Ownership in the Large CEAA consists primarily of private lands (59%) and there is

substantial human activity and development near Ferndale and in the valley bottom. Open road density is high at 4.4 miles/square mile and in combination with development, this likely limits grizzly bear use of the area.

### **Environmental Effects- Grizzly Bears**

#### **No Action Alternative: Direct and Secondary Effects on Grizzly Bears**

None of the proposed forest management activities would occur. In the short-term, no changes to grizzly bear habitat would be expected. Visual screening, risk of displacement, and open and restricted road density would remain the same. However, in the long-term and in the absence of natural disturbance, visual screening may increase as stands age increasing the availability of visual screening.

#### **No Action Alternative: Cumulative Effects on Grizzly Bears**

None of the proposed forest management activities would occur. No changes to human-caused mortality risk, risk of displacement, or road density associated with the Ferndale Timber Sale would occur, but ongoing and proposed forest management projects within the Large CEAA could affect these attributes. In the short-term no additional cumulative effects to visual screening would occur. However, in the long-term and in the absence of natural disturbance, the availability of visual screening may increase as stands age.

#### **Action Alternative: Direct and Secondary Effects on Grizzly Bears**

The proposed activities would impact 561 acres (89%) of the 628 acres of grizzly bear visual screening in the Project Area. Of these acres, 440 acres (78%) of visual screening would be removed for approximately 10-20 years. The remaining 121 acres would be treated with commercial thin and old-growth maintenance treatments and would continue providing hiding cover post-harvest. Harvesting associated with the Action Alternative would increase sight distances within all of the proposed harvest units. However, regeneration would be retained to the extent possible and would break up sight distances. Riparian habitat, which is preferred by bears, would not be logged. Proposed harvesting would temporarily (1 to 3 years) increase traffic on 5 miles of roads including 0.6 miles of temporary roads, which would be removed post-harvest. Temporary roads would be closed with berms and portions would also be obliterated to ensure that these roads cannot be driven post-harvest. If present near the Project Area, grizzly bears could be displaced from portions of the Project Area by forest management activities for up to 3 years; although spring timing restrictions would be enforced from April 1 – June 15 to provide security for grizzly bears in the spring. Thus, since: 1) canopy cover and shrubs providing visual screening would be removed from approximately 561 acres (89%) of potential visual screening in the Project Area; 2) temporary motorized disturbance would increase on 5 miles of roads; 3) open road density would not change; 4) riparian habitat would not be harvested; and 5) logging would be prohibited in the spring; moderate adverse direct or indirect effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the Action Alternative.

#### **Action Alternative: Cumulative Effects on Grizzly Bears**

The proposed activities would affect 561 acres (4%) of the 2,318 acres of visual screening available in the Large CEAA. Of these acres, 440 would not provide suitable visual screening post-harvest. However, regeneration would be retained throughout all cutting units to break up sight distances and to provide visual screening. Riparian habitat would not be impacted by the proposed logging. Proposed harvesting would increase traffic on approximately 9 miles of roads (excluding highways) in the Large CEAA, including 0.6 miles of temporary roads. Temporary roads would be closed with berms and portions would also be obliterated to prevent further use of these roads by the public. Reductions in visual screening would be additive to proposed or ongoing projects including the proposed USFS Bug Creek Timber Sale (*TABLE WI-2*). Grizzly bears could be temporarily displaced by forest management activities associated with the proposed Ferndale Timber Sale for up to 3 years; however, activities would be restricted from April 1 – June 15 to protect bears in the spring. Thus, since: 1) canopy cover and shrubs providing visual screening would be removed from approximately 561 acres (4%) of potential visual screening in the Large CEAA; 2) temporary motorized disturbance would increase on 9 miles of open and restricted roads; 3) open road density would not change post-harvest; 4) riparian habitat would not be impacted; and 5) logging would be prohibited in the spring; minor adverse

cumulative effects associated with grizzly bear displacement or human-caused bear mortality risk would be anticipated as a result of the Action Alternative.

## CANADA LYNX

### Issue

The proposed activities could reduce landscape connectivity and the availability of suitable Canada lynx habitat, reducing the capacity of the area to support Canada lynx.

### Introduction

Canada lynx are medium-size cats that prey primarily on snowshoe hares, and they are federally listed as a threatened species (*Ruediger et al. 2000*). Lynx foraging habitat in western Montana consists of a mosaic of young coniferous stands and mature forested stands with high levels of canopy cover, which provide snowshoe hare habitat (*Squires et al. 2010, Squires et al. 2013*). Retaining habitat connectivity of both summer and winter lynx foraging habitat is important since winter corridors may provide local connectivity while summer corridors are more likely to facilitate long-distance dispersal (*Squires et al. 2013*). Forest management considerations for lynx include providing a mosaic of well-connected young and mature lynx habitat patches containing high horizontal cover.

### Analysis Area

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 28,392-acre Large CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Large CEAA approximates the size of a lynx home range, is centered on the Project Area, and is defined according to geographic features (i.e., ridgelines and streams), which are likely to influence movements of Canada lynx near the Project Area providing a reasonable analysis area for Canada lynx that could be influenced by project-related activities.

### Measurement Criteria

Factors considered in the analysis include: 1) the level of harvesting, 2) the availability of suitable lynx habitat classes, and 3) landscape connectivity. Suitable lynx habitat was subdivided into the following lynx habitat classes: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. All habitat classes were identified according to DNRC's lynx habitat mapping protocols (*USFWS and DNRC 2010*). Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat, but does not contain the necessary attributes to be classified as winter or summer foraging habitat classes. The temporary non-habitat category consists of forested stands that are not expected to be used by lynx until suitable horizontal cover develops. On non-DNRC lands, stands with  $\geq 40\%$  canopy cover provided by trees  $>9$  inches dbh on average were considered to provide potential lynx habitat.

### Existing Environment

The Project Area contains suitable lynx habitat (*TABLE WI-5*). Stands that do not provide potential habitat in the Project Area consist of 109 acres of dry western larch and Douglas-fir stands in Section 4 that are not preferred lynx cover types. Suitable lynx habitat is continuous across the Project Area except for in Section 4.

The Large CEAA contains suitable lynx habitat (*TABLE WI-5*), with the majority of potential lynx habitat located on USFS lands in the Mission Mountains. The remaining portions of the CEAA consist primarily of young recently harvested stands as well as areas in the valley bottom that have been cleared for residences and agriculture. Near the Project Area and on surrounding lands, connectivity of lynx habitats is moderate, with limited narrow corridors in the southern portion of the Large CEAA between the Swan and Mission mountains.

**Table WI-5— Estimated acreage of lynx habitat that would remain in the Project Area and Large CEAA post-harvest. Values in parentheses refer to the percentage of the total potential lynx habitat<sup>a</sup> that each lynx habitat class represents.**

Lynx Habitat Category	Project Area		Large CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Other Suitable (DNRC Lands)	19 (3%)	354 (57%)	136 (8%)	472 (26%)
Summer Foraging (DNRC Lands)	31 (5%)	31 (5%)	133 (7%)	133 (7%)
Winter Foraging (DNRC Lands)	568 (92%)	177 (29%)	1,400 (77%)	1,009 (56%)
Temporary Non-habitat (DNRC Lands)	0 (0%)	56 (9%)	147 (8%)	203 (11%)
Grand Total - Suitable Lynx Habitat (DNRC Lands)	618 (100%)	563 (91%)	1,669 (92%)	1,614 (89%)
Additional Potential Habitat – non-DNRC Ownership	0	0	11,932	11,932
Grand Total - Suitable Lynx Habitat <sup>b</sup> (All Ownerships)	618 (100%)	563 (91%)	13,602 (99%)	13,546 (99%)

<sup>a</sup>Total potential lynx habitat describes all stands that contain appropriate habitat types for lynx (i.e., sum of summer forage, winter forage, other suitable, and temporary non-suitable lynx habitat classes).

<sup>b</sup>Total suitable lynx habitat describes all lynx habitat categories that contain structural attributes necessary for lynx use (i.e., sum of summer forage, winter forage, other suitable lynx habitat classes, potential habitat on non-DNRC lands).

## **Environmental Effects**

### **No Action Alternative: Direct, Secondary, and Cumulative Effects on Canada Lynx**

None of the proposed forest management activities would occur on DNRC lands. In the short-term, lynx habitat availability and connectivity would not change. In the long-term and in the absence of natural disturbance, winter foraging habitat availability would increase due to natural forest succession while summer foraging habitat availability would decrease due to the lack of young regenerating stands. Connectivity may also increase in the long-term due to increasing canopy cover over time.

### **Action Alternative: Direct and Secondary Effects on Canada Lynx**

The proposed activities would affect 560 acres (91%) of the 618 acres of suitable lynx habitat available in the Project Area. After harvest, most of these acres would remain suitable post-harvest, although 55 acres would not retain sufficient conifer canopy cover to continue providing lynx habitat (*TABLE WI-5*). These 55 acres would likely be suitable for lynx use again in 10-15 years after young trees have grown to at least 6 feet in height. To ensure that forest structural attributes preferred by snowshoe hares remain following harvest, dense patches of advanced regeneration would be retained in lynx winter forage habitat. Additionally, 4 to 15 tons/acre of coarse woody debris would be retained in accordance with DNRC Forest Management Rules (*ARM 36.11.414*) and retention of downed logs  $\geq 15$  inch diameter would be emphasized. Lynx habitat connectivity would be reduced; however, overall, suitable lynx habitat would remain continuous due to the retention of a 300-foot wide corridor along a tributary to Carney Creek and retention of additional canopy cover along riparian areas. If present near the Project Area, lynx could be temporarily displaced by forest management activities for approximately 3 years due to disturbance caused by motorized activities. Thus, since: 1) lynx suitable habitat availability would be reduced by 55 acres (9%) of existing habitat in the Project Area; 2) an additional 505 acres (90%) of existing habitat would be impacted by logging, but would remain suitable for lynx use post-harvest; 3) patches of shade-tolerant trees would be retained where feasible in winter foraging habitat; and 4) landscape connectivity would be reduced but corridors would remain; moderate adverse direct and secondary effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the Action Alternative.



### **Action Alternative: Cumulative Effects on Canada Lynx**

The proposed activities would affect 560 acres (4%) of the 13,601 acres of suitable lynx habitat available in the Large CEAA (*TABLE WI-5*). Most of these acres would remain suitable for lynx post-harvest except for 55 acres that would be treated with a overstory removal cut. To provide important lynx and snowshoe hare habitat components post-harvest, patches of shade tolerant trees, approximately 4 to 15 tons/acre of coarse woody debris, and large downed logs  $\geq 15$  inch diameter would be retained. Lynx habitat connectivity would be slightly reduced; but a large corridor would be retained along the tributary to Carney Creek in Section 4 and overall the majority of lynx habitat would remain suitable post-harvest. Overall, connectivity of potential lynx habitat near the Project Area would be minimally affected by the proposed timber harvest. Changes to lynx habitat availability and connectivity would be additive to past, proposed, and ongoing project including the USFS Bug Creek Timber Sale which is currently in the development phase (see *TABLE WI-2*). Lynx could be temporarily displaced by forest management activities associated with the Ferndale Timber Sale and other ongoing activities for approximately 3 years. Thus, since: 1) lynx suitable habitat availability would be reduced by 55 acres ( $<1\%$  of potentially suitable lynx habitat in the Large CEAA); 2) an addition 505 acres (4%) of existing habitat would be impacted by logging, but would remain suitable for lynx use post-harvest; 3) patches of advanced regeneration and shade-tolerant understory trees would be retained where feasible; and 4) landscape connectivity would be minimally affected; minor adverse cumulative effects to Canada lynx associated with landscape connectivity and suitable habitat type availability would be anticipated as a result of the Action Alternative.

## **Sensitive Species**

### **FISHERS**

#### **Issue**

The proposed activities could reduce the availability and connectivity of suitable fisher habitat and increase human access, which could reduce fisher habitat suitability and increase trapping mortality

#### **Introduction**

In the Rocky Mountains, fishers prefer mesic late-successional forests with complex vertical and horizontal structure, large-diameter trees, and relatively dense canopies (*Raley et al. 2012, Schwartz et al. 2013*). Fishers generally avoid large openings, clearcuts, and ponderosa pine and lodgepole pine stands (*Schwartz et al. 2013*). Fishers prey upon snowshoe hares, ungulate carrion, porcupines, birds, and small mammals as well as seasonally available fruits and berries. Fisher resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fishers involve providing upland and riparian resting and denning habitat, maintaining a network of travel corridors, and reducing trapping risk associated with motorized access.

#### **Analysis Area**

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Medium CEAA is centered on the Project Area and is defined according to geographic features and could support the home range of one fisher, providing a reasonable analysis area for fishers that could be influenced by project-related activities (*Olson et al. 2014*).

#### **Measurement Criteria**

Factors considered in the analysis include: 1) the degree of harvesting, 2) availability and structure of preferred fisher habitats (upland, riparian), and 3) landscape connectivity. Fisher habitat classifications considered in the analysis include: 1) upland fisher habitat, and 2) riparian fisher habitat, which are defined according to proximity of the forest stand to streams. Riparian fisher habitat is located within 100 feet of Class 1 streams or within 50 feet of Class 2 streams (*ARM 36.11.440(b)*). The remaining fisher habitat is considered upland fisher habitat. Habitat structure considered appropriate for fisher use includes stands with 40-100% total stocking

density. Potential fisher habitat (riparian, upland) on other ownerships was identified by identifying mature forested habitat ( $\geq 40\%$  cover, trees  $> 9$  inches dbh average) below 6,000 feet elevation and proximity to perennial and intermittent streams.

### Existing Environment

Fisher habitat is present in the Project Area and Medium CEAA (*TABLE WI-6*). In the Project Area, suitable fisher habitat is mostly continuous except for the young previously logged stands and dry Douglas-fir and wester larch stands in Section 4.

In the Medium CEAA, potential fisher habitat is located throughout the CEAA with most potential habitat located in the east-facing slopes of the Mission Mountains where moist forest types and mature timber stands are located on USFS lands. The eastern portion of the CEAA consists of younger stands in the valley bottom that have been cleared for residences and agriculture and are not likely to support fishers.

**Table WI-6 –Fisher Habitat in the Project Area and Medium CEAA and anticipated effects of the Ferndale Timber Sale, including potential habitat on non-DNRC ownership. Values in parentheses refer to the percentage that each fisher habitat type represents within the larger analysis area.**

Fisher Habitat Attribute	Project Area		Medium CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Fisher Habitat <sup>a</sup>	640 (87%)	187 (25%)	4,756 (61%)	4,303 (55%)
Fisher Habitat Harvest (% of available habitat)		599 (94%)		599 (10%)

<sup>a</sup> Includes potential habitat available on other ownerships.

### Environmental Effects

#### No Action Alternative: Direct, Secondary, and Cumulative Effects on Fishers

None of the proposed forest management activities would occur on DNRC lands. The level of motorized access would not change and no additional risk associated with trapping would be expected. In the short term, no changes to fisher habitat availability or connectivity would occur in the Project Area. In the long-term and in the absence of natural disturbance, fisher habitat suitability and connectivity may increase as stands age, the availability of large-diameter trees increases, and mature canopy cover increases.

#### Action Alternative: Direct and Secondary Effects on Fishers

The proposed activities would affect fisher habitat (*TABLE WI-6*). Approximately 543 acres (85%) of existing fisher habitat would be treated shelterwood and overstory removal treatments and would not provide suitable fisher habitat post-harvest due to low retention of mature trees. An additional 146 acres (23%) of fisher habitat would be treated with old-growth maintenance and commercial thin cuts and these stands would continue providing suitable fisher habitat, albeit at a reduced stand density. Fisher riparian habitat would not be affected by the proposed activities. The availability of some important habitat characteristics (i.e., snags, coarse woody debris) could be reduced by harvest activities; although retention of dead material and live snag recruitment trees would meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*). Approximately 0.6 miles of temporary road would be constructed, but these roads would be closed with berms and portions would also be obliterated, therefore trapping risk would not increase. However, open road density would not change. Connectivity of mature forested habitat suitable for fisher use would decrease under the Action Alternative, particularly in Sections 3 and 10 where shelterwood treatments are proposed. However, a large connectivity corridor would be retained in Section 4 between Carney Creek and the Mission Mountains and travel across the greater Project Area would remain feasible. If present near the Project Area, fishers could be temporarily displaced by forest management activities approximately 3 years. Thus, since: 1) habitat availability would be reduced by 543 acres (85%), but some snags and coarse woody debris would be retained; 2) Stand density

would be reduced in an additional 146 acres (23%) of fisher habitat; 3) fisher riparian habitat would not be affected; 4) landscape connectivity would be reduced, but connectivity corridors would be retained; and 5) trapping risk would not increase; high adverse direct and secondary effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the Action Alternative.

### **Action Alternative: Cumulative Effects on Fishers**

Fisher habitat would be affected by the proposed activities (*TABLE WI-6*). Approximately 543 acres (11%) of potential fisher habitat would not be suitable for fisher use post-harvest due to low tree retention and 146 acres (3%) would be logged but continue providing fisher habitat at a reduced stand density. The availability of some important habitat characteristics (i.e., snags, coarse woody debris) could be reduced by harvest activities; although retention of some dead material and live snag recruitment trees would be required to meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*). Connectivity to existing potential habitat patches would be retained post-harvest. A corridor would be retained in Section 4 and travel across the valley bottom would remain feasible due to low amounts of canopy removal in Section 10. Approximately 0.6 miles of temporary roads would be constructed. However, post-harvest trapping risk is not anticipated to increase because these roads would be closed with berms and portions would be obliterated. Any adverse effects to fisher would be additive to any proposed or ongoing sales in the Medium CEAA (*TABLE WI-2*), including the USFS Bug Creek Timber Sale, which is in the development phase. Fisher displacement associated with the proposed Ferndale Timber Sale and any other activities in the CEAA could occur for up to 3 years. Thus, since: 1) habitat availability would decrease by 543 acres (11% of available potential habitat), but snags and coarse woody debris would be retained (*ARM 36.11.411, ARM 26.11.414*); 2) an additional 146 acres (3%) would be harvested, but would remain suitable for fisher use post-harvest; 3) fisher riparian habitat would not be affected; 4) landscape connectivity would be reduced, but a travel corridor would be retained in Section 4 and travel would remain feasible across the MCEAA; and 5) trapping risk would not increase; minor adverse cumulative effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the Action Alternative.

## **FLAMMULATED OWL**

### **Issue**

The proposed activities could alter the structure of flammulated owl preferred habitat, which could reduce habitat suitability for flammulated owls.

### **Introduction**

Flammulated owls are small, migratory, insectivorous forest owls that inhabit mature, dry stands of ponderosa pine and Douglas-fir with an open physiognomy (*Linkhart and McCallum 2013*). Flammulated owls are secondary cavity nesters, and in Montana, typically nest in large-diameter ponderosa pine or Douglas-fir cavities excavated by pileated woodpeckers or northern flickers (*Seidensticker et al. 2013*). Forest management considerations for flammulated owls include providing open stands of ponderosa pine and Douglas-fir and retaining large snags for nesting. Timber harvest may affect the structure of timber stands and reduce the availability of snags, potentially reducing habitat suitability for flammulated owls.

### **Analysis Area**

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA as described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Medium CEAA is defined according to ridgelines and creeks, which provides a reasonable analysis area for local flammulated owls that could be affected by project-related activities.

### **Measurement Criteria**

Factors considered in the analysis include: 1) the degree of harvesting, and 2) the structure of flammulated owl preferred habitat. In the Project Area, SLI data were used to identify preferred flammulated owl habitat types (*ARM 36.11.403(28)*). Stands were considered suitable for flammulated owl use if the stocking density of trees

>9 inches dbh was in the poorly-stocked class (10-39% canopy cover). On non-DNRC lands, stands containing 10-39% canopy cover that were composed primarily of trees >9 inches dbh below 6,000 feet were considered likely to contain habitat types preferred by flammulated owls as well as matrix habitat.

### **Existing Environment**

The Project Area contains 109 acres (15% of Project Area) of cover types preferred by flammulated owls. This habitat is composed primarily of mixed Douglas-fir and western larch stands located in Section 4. All of these stands are mature (> 9 inches dbh); however, canopy cover is >40% in 72 of these acres and these stands may be too dense to be used by flammulated owls.

The Medium CEAA contains approximately 640 acres (8% of Medium CEAA) of mature open forested stands (10-39% canopy cover, 9 inches dbh average). These stands are scattered throughout the CEAA; the majority of the CEAA either contains very low canopy cover in the valley bottom or high canopy cover >40% in the Mission Mountains. Considering the low availability of open stands and wet forest types that dominate the area; the likelihood of flammulated owls inhabiting the Medium CEAA this habitat is low.

### **Environmental Effects**

#### **No Action Alternative: Direct, Secondary, and Cumulative Effects on Flammulated Owls**

None of the proposed forest management activities would occur on DNRC lands. In the short-term, no change in the availability of flammulated owl habitat would occur. In the long-term and in the absence of natural disturbance, the suitability of flammulated owl habitat may decrease as stand density increases and Douglas-fir continues to grow in the understory.

#### **Action Alternative: Direct and Secondary Effects on Flammulated Owls**

Timber harvest would occur in 99 of the 109 acres (91%) of preferred flammulated owl cover types available in the Project Area. The proposed activities would open stands to 5-30% canopy cover in these acres, improving stand structure suitability for flammulated owls. Additionally, the proposed harvest would favor leaving Douglas-fir and western larch while removing shade-tolerant trees, which is preferable for flammulated owls (*ARM 36.11.437(b)*). Some snags could be removed by the proposed harvest, but at least 2 large snag and 2 large snag recruitment tree per acre (>21 inches dbh) would be retained (*ARM 36.11.411*). Disturbance associated with harvesting could adversely affect flammulated owls for approximately 3 years, should they be present in the Project Area. Thus, since: 1) changes in stand structure and cover type would generally increase flammulated owl habitat suitability, and 2) snags would be retained to meet DNRC administrative rules (*ARM 36.11.411*), minor beneficial direct and secondary effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative.

#### **Action Alternative: Cumulative Effects on Flammulated Owls**

The proposed activities would occur in 99 acres (16%) of the 631 acres of potential flammulated owl habitat in the Medium CEAA. The proposed activities would open stands to 5-30% canopy cover, favor retention of western larch and Douglas-fir, and retain patches of regenerating conifers, improving stand structure suitability for flammulated owls (*ARM 36.11.437(b)*). Changes in flammulated owl habitat suitability would be additive to proposed and ongoing activities occurring in the Medium CEAA (*TABLE WI-2*), including the USFS Bug Creek Timber Sale which is in the development phase. The Action Alternative could disturb flammulated owls for up to 3 years should they be present near the Project Area. Thus, since 1) changes in structure and cover type would generally increase flammulated owl habitat suitability, and 2) snags would be retained to meet DNRC administrative rules (*ARM 36.11.411*), minor beneficial cumulative effects to flammulated owl habitat suitability would be anticipated as a result of the Action Alternative.

## **PILEATED WOODPECKERS**

### **Issue**

The proposed activities could reduce tree density and alter the structure of mature forest stands, which could reduce habitat suitability for pileated woodpeckers.

### **Introduction**

Pileated woodpeckers play an important role in mature forests by excavating large cavities that are often used in subsequent years by a variety of wildlife species for nesting and roosting. Pileated woodpeckers require mature forest stands with large-diameter ( $\geq 20$  inch dbh) dead or defective trees for nesting and foraging and the density of pileated woodpeckers is positively correlated with the amount of dead and dying wood in a stand (McClelland 1979). Timber harvest may remove large-diameter trees necessary for nesting and fragmentation can make birds more vulnerable to predation as they travel between habitat patches (Bull and Jackson 2011). Forest management considerations for pileated woodpeckers include retaining dense patches of old and mature coniferous forest with abundant large snags and coarse-woody debris for foraging, roosting, and nesting.

### **Analysis Area**

The analysis area for direct and secondary effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA which is defined according to geographic features as described in TABLE WI-1 and depicted in FIGURE WI-1. This scale provides a sufficient area to support multiple pairs of pileated woodpeckers (Bull and Jackson 2011).

### **Measurement Criteria**

Factors considered in the analysis include: 1) the degree of harvesting and 2) the structure of pileated woodpecker preferred habitat types. On DNRC-managed lands, sawtimber stands  $\geq 100$  years old within preferred pileated cover types (ARM 36.11.403(58)) with  $\geq 40\%$  canopy closure were considered potential pileated woodpecker habitat. On non-DNRC lands, mature forest stands ( $\geq 40\%$  canopy cover,  $> 9$  inches dbh average) below 6,000 feet elevation were considered potential pileated woodpecker habitat.

### **Existing Environment**

The Project Area contains 330 acres (45% of Project Area) of suitable pileated woodpecker habitat. This habitat is composed of Douglas-fir and western larch stands primarily in Section 3 where there are appropriate forest types and age classes. Pileated woodpeckers were observed during field visits and foraging on snags was observed and snag availability is high at approximately 35 snags per acre (range: 7-86 snags per acre,  $n=9$ ). However, firewood is regularly harvested from the Project Area and snag availability is low adjacent to open roads.

The Medium CEAA contains 4,360 acres (56% of Medium CEAA) of potential pileated woodpecker habitat scattered throughout the CEAA including 355 acres on DNRC lands and 4,005 acres on other ownerships. An additional 575 acres of mature stands with  $< 40\%$  canopy cover occur in the CEAA, which may facilitate connectivity, but would not provide suitable habitat. The remaining stands consist primarily of young stands that were recently harvested or areas that have been cleared for residences and agriculture in the valley bottom. Open road density in the Medium CEAA is 3.4 miles/square mile, which provides access for firewood cutting and may reduce snag availability for nesting.

### **Environmental Effects**

#### **No Action Alternative: Direct, Secondary, and Cumulative Effects on Pileated Woodpeckers**

None of the proposed forest management activities would occur on DNRC lands. In the short-term, no changes to pileated woodpecker habitat would be anticipated. However, in the long-term, and in the absence of natural disturbance, pileated woodpecker habitat availability and connectivity may increase due to natural succession and aging of timber stands.

#### **Action Alternative: Direct and Secondary Effects on Pileated Woodpeckers**

The proposed activities would occur in 315 acres (96%) of the 330 acres of pileated woodpecker habitat available in the Project Area. Most of these acres would be treated with a shelterwood treatment which would open the stands to 20-30% canopy cover causing these acres to become unsuitable for appreciable use by pileated woodpeckers. Snags would be removed by the proposed harvest, but at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh) would be retained and snags cut for safety reasons would be left in the harvest unit (*ARM 36.11.411*). Disturbance associated with harvesting could adversely affect pileated woodpeckers on portions of the Project Area for approximately 3 years, should they be present in the Project Area. Thus, since: 1) forest structural changes would occur, but mitigation would include retention of snags and coarse woody debris (*ARM 36.11.411*, *ARM 36.11.414*); and 2) harvesting would reduce pileated woodpecker suitable habitat availability by 315 acres (96%); high adverse direct and secondary effects to pileated woodpecker habitat suitability in the Project Area would be anticipated as a result of the Action Alternative.

#### **Action Alternative: Cumulative Effects on Pileated Woodpeckers**

The proposed activities would occur in 315 acres (7%) of the 4,360 acres of potential pileated woodpecker habitat in the Medium CEAA reducing habitat availability. Most of these acres would retain 20-30% canopy cover post-harvest, which is not sufficient for appreciable pileated woodpecker use. Snags would be removed by the proposed harvest, but at least 2 large snags and 2 large snag recruitment trees per acre (>21 inches dbh) would be retained (*ARM 36.11.411*). Changes in pileated woodpecker habitat suitability would be additive to proposed and ongoing activities occurring in the Medium CEAA (*TABLE WI-2*), including the proposed USFS Bug Creek Salvage which is in the development phase. Disturbance associated with the proposed activities could adversely affect pileated woodpeckers near the Project Area for up to 3 years. Thus, since: 1) structural changes would occur, but mitigations would include retention of snags and coarse woody debris; and 2) harvesting would reduce pileated woodpecker suitable habitat availability by 315 acres (7%) within the Medium CEAA; minor adverse cumulative effects to pileated woodpecker habitat suitability would be anticipated as a result of the Action Alternative.

## **BIG GAME WINTER RANGE**

### **Issue**

The proposed activities could reduce cover, which could reduce the quality of big game winter range habitat.

### **Introduction**

Big game, including elk, mule deer, and white-tailed deer require areas with adequate amounts of cover and forage at lower elevations during winter. Effective winter range contains ample mid-story and overstory, which can ameliorate severe winter conditions by reducing wind velocity and providing snow intercept, increasing the ability of game animals to move efficiently across the landscape and improving access to forage with less energy expenditure. Forest management considerations for big game include providing adequate hiding cover and ample overstory, which reduce the effects of harsh winter weather conditions.

### **Analysis Areas**

The analysis area for direct and indirect effects is the Project Area and the analysis area for cumulative effects is the 7,769-acre Medium CEAA described in *TABLE WI-1* and depicted in *FIGURE WI-1*. The Medium CEAA includes the Project Area as well as other lands nearby that may provide winter range. The area is defined according to geographic features including ridgelines and streams, which provides a reasonable analysis area for local big game animals that could be influenced by project-related activities.

### **Measurement Criteria**

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of available big game winter range. The availability of mature forested habitat ( $\geq 40\%$  canopy cover,  $>9$  inch dbh average) was used to assess the quality of big game winter range in the Medium CEAA. Factors considered in the analysis include: 1) the degree of timber harvesting, and 2) the availability and structure of big game winter range.

### Existing Environment

The entire Project Area provides potential white-tailed deer winter range (DFWP 2008). Desirable winter range habitat attributes found in the Project Area include low elevation (below 5,300 feet), riparian valley bottoms, and appreciable amounts of canopy cover. Thermal cover is present throughout the Project Area except for a few patches of young trees in Section 4 (TABLE WI-7).

The entire Medium CEAA is considered white-tailed deer winter range (DFWP 2008). Riparian bottoms along the Swan River and Carney Creek likely provide good winter range in the Medium CEAA. Thermal cover occurs in the Project Area and is more prevalent in the Mission Mountains, although scattered patches are present throughout the valley bottom (TABLE WI-7, FIGURE WI-2). The Medium CEAA is a part of a larger winter range extending north into the Flathead Valley and south along the Swan River. The remaining habitat in the Medium CEAA consists of open mature stands and areas that have been cleared for residences and agriculture.

**Table WI-7 – The acreage of thermal cover under DNRC Ferndale Timber Sale alternatives in the Project Area and Medium CEAA.**

Species/Attribute	Project Area		Medium CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
White-tailed deer	677	199	4,796	4,316
(percent of analysis area)	(92%)	(27%)	(62%)	(56%)

### Environmental Effects

#### No Action Alternative: Direct, Secondary, and Cumulative Effects on Big Game

None of the proposed forest management activities would occur on DNRC lands. No changes in disturbance levels would occur. In the short-term, no change in the availability of thermal cover would occur. In the long-term and in the absence of natural disturbance, thermal cover may increase as stands age and canopy cover increases.

#### Direct and Indirect Effects of the Action Alternative on Big Game Winter Range

Big game winter range and thermal cover would be affected by the proposed activities (TABLE WI-7). Approximately 627 acres of winter range would be impacted by the proposed activities. Of these acres, 149 acres would retain 40-60% mature canopy cover and would continue providing thermal cover, albeit at a reduced density and possibly quality, post-harvest. The remaining 478 acres would be treated with regeneration cuts and would retain 5-30% mature canopy cover post-harvest. These acres would not provide thermal cover when snow accumulation is high. Patches of regenerating conifers would be retained throughout the harvest units, providing some residual cover and needle-foraging opportunities. Winter logging may occur but would not be required. Wintering animals could be displaced for up to 3 winters by the proposed activities. Thus, since: 1) 478 acres (71%) of existing thermal cover would be removed; 2) patches of regenerating conifers would be retained, 3) displacement of big game would be temporary (up to 3 years); moderate adverse direct and indirect effects to big game winter range quality and wintering animals would be anticipated as a result of the Action Alternative.

#### Cumulative Effects of the Action Alternative on Big Game Winter Range

Big game winter range and thermal cover would be affected by the proposed activities (TABLE WI-7). Timber harvest would remove thermal cover in the Project Area, removing 478 acres of thermal cover and reducing the quality of an additional 149 acres of thermal cover. Changes in thermal cover availability would be additive to past, proposed, and ongoing activities occurring in the Medium CEAA (TABLE WI-2) including the USFS Bug Creek Timber Sale, which is in the development phase. Winter logging may occur but would not be required. Wintering animals could be displaced from portions of the Medium CEAA by activities associated with the Ferndale Timber Sale and any other ongoing activities in the CEAA for approximately 3 winters. Thus, since: 1) thermal cover would be removed on 478 acres (10%) of existing thermal cover; 2) regenerating conifers would be retained; and 4) displacement of big game would be additive to other sources of disturbance, but would occur for a short period of time (3 years); minor adverse cumulative effects to big game winter range quality and wintering animals would be anticipated as a result of the Action Alternative.

## Wildlife Mitigations

- If a threatened or endangered species is encountered, consult a DNRC biologist immediately. Similarly, if undocumented nesting raptors or wolf dens are encountered within ½ mile of the Project Area contact a DNRC biologist.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per *ARM 36.11.444(2)* and *GB-PR2 (USFWS and DNRC 2010)*.
- Contractors will adhere to food storage and sanitation requirements as described in the timber sale contract. Ensure that all attractants such as food, garbage, and petroleum products are stored in a bear-resistant manner.
- Restrict public access at all times on restricted roads that are opened for harvesting activities. Effectively close all restricted roads following harvest completion.
- Prohibit commercial forest management activities from April 1- June 15 to protect grizzly bears during the spring in all units. In the Section 10 40-acre unit adjacent to Loon Lake, extend the timing restriction from April 1 – July 15 to protect nesting loons.
- In Section 9, 4 years of active management is permitted followed by an 8-year rest as per GG-SC2. The active/rest period must be tracked by the contract administrator.
- Retain patches of advanced regeneration of shade-tolerant trees as per *LY-HB4* in all harvest units (*USFWS and DNRC 2010*).
- Retain visual screening along roads where possible to increase security for wildlife.
- Retain at least 2 snags and 2 snag recruits per acre that are ≥ 21 inches diameter or the next largest available size class, favoring western larch and Douglas-fir for retention. If snags are cut for safety concerns, they must be left in the harvest unit.
- Retain 4 to 15 tons/acre of coarse-woody debris. Retain coarse-woody debris according to *ARM 36.11.414* and emphasize retention of 15-inch diameter downed logs aiming for at least one 20-foot-long section per acre.

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Figure WI-1 –Wildlife analysis areas for the proposed Ferndale Timber Sale.

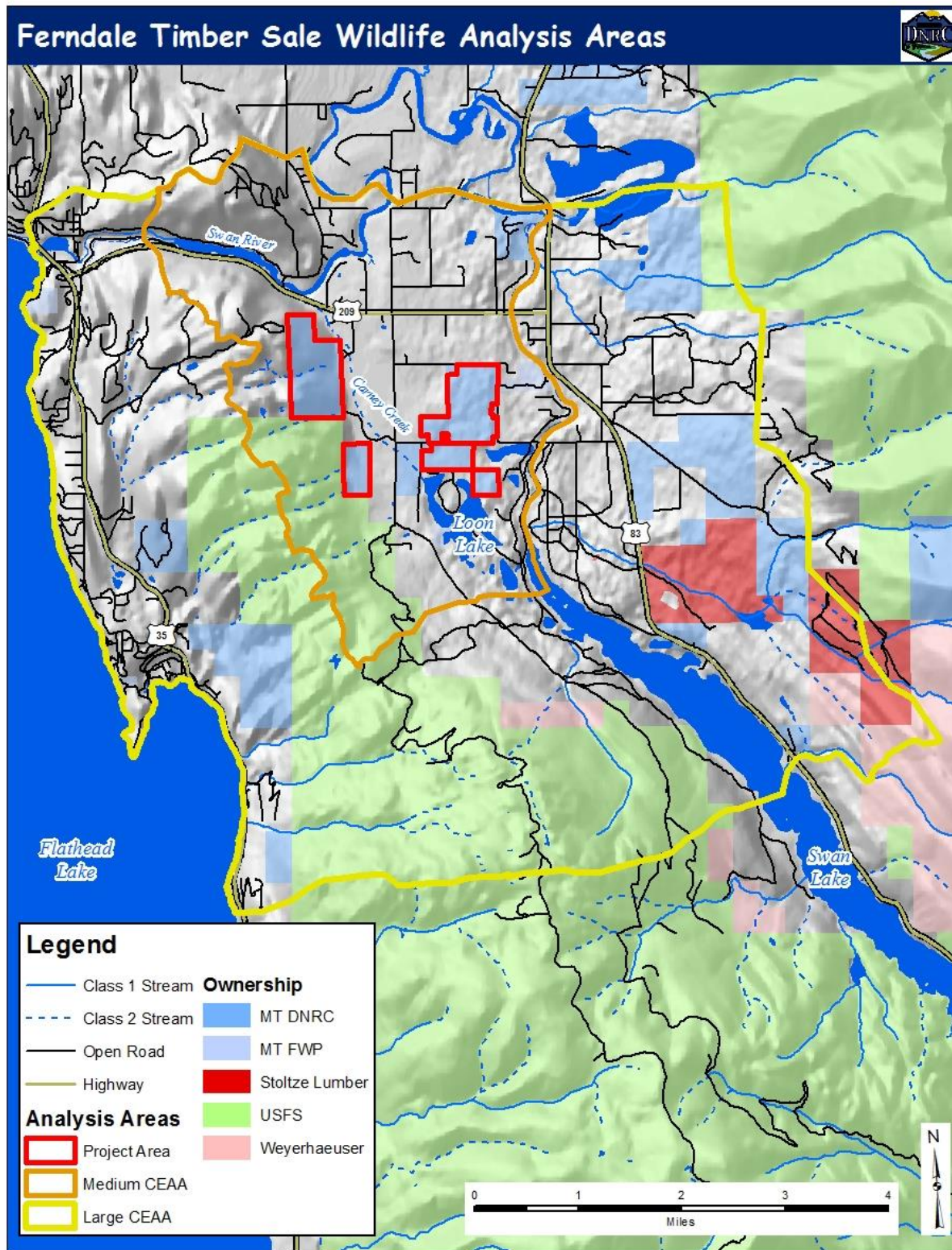




Figure WI-2 –Harvest units, mature canopy cover, and potential connectivity areas for the proposed Ferndale Timber Sale.

